THE MARINE REVIEW

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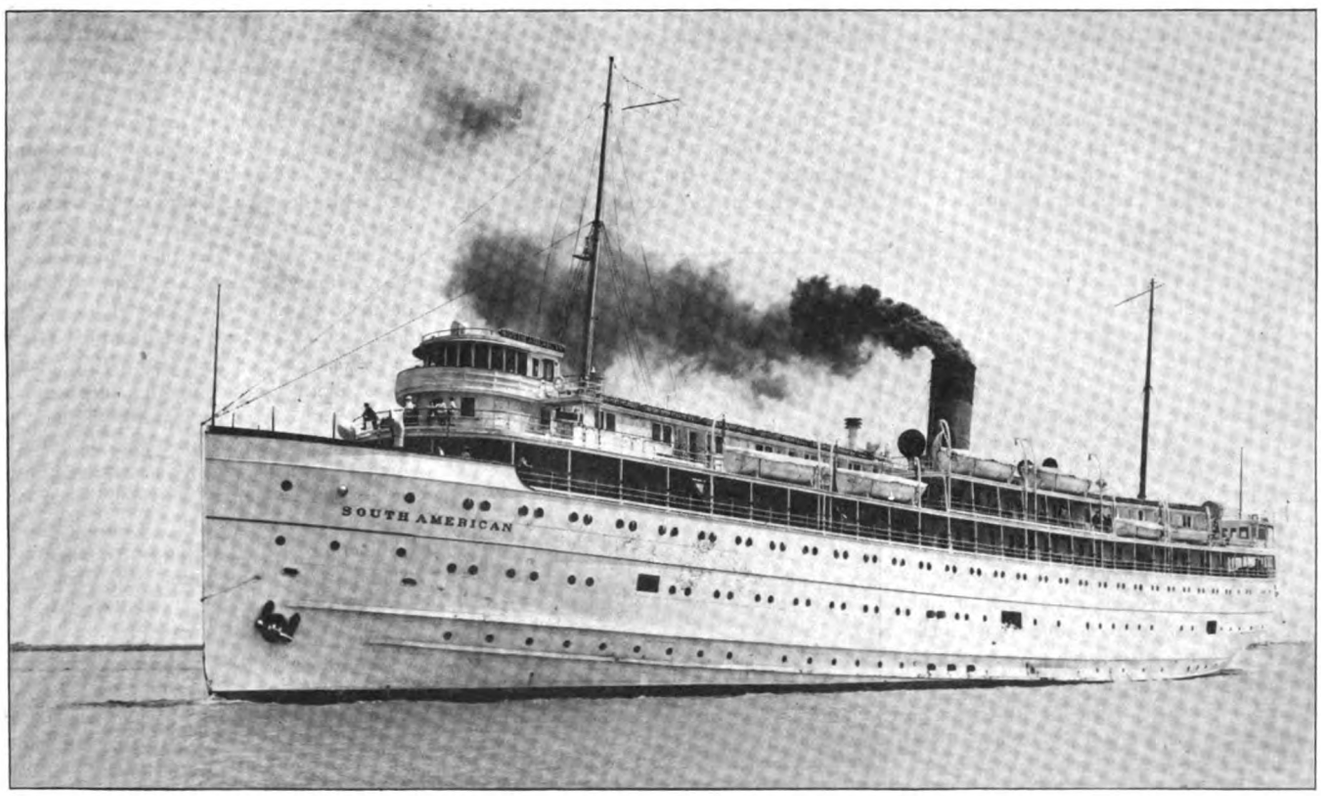
Steamer South American

She Has Proved Very Popular in the New Route Established by the Chicago, Duluth & Georgian Bay Transit Co.

THE steamer South American, built for the Chicago, Duluth & Georgian Bay Transit Co. by the Great Lakes Engineering Works, Detroit, has proved very popular in the trade and there is talk of adding a third vessel to this fleet, which now consists of the North American and the South American. The principal dimensions of the South American are: Length over all, 314 feet; length on keel, 291 feet; breadth, molded, 47 feet; depth, molded, 18 feet.

The vessel is exclusively a passenger boat, carrying no freight, and has accommodations for 540 passengers and a crew of 160. The hull of the steamer is divided into seven compartments by six watertight bulkheads. The three lower decks are of steel and the two upper ones of wood. The general arrangement of the vessels has been well thought out. The main dining room with a seating capacity for 276 passengers is located forward on the orlop deck and is finished in silvered oak with cork tile flooring. Immediately under



THE PASSENGER STEAMER SOUTH AMERICAN, BUILT BY THE GREAT LAKES ENGINEERING WORKS, DETROIT, FOR THE CHICAGO, DULUTH & GEORGIAN BAY TRANSIT CO.

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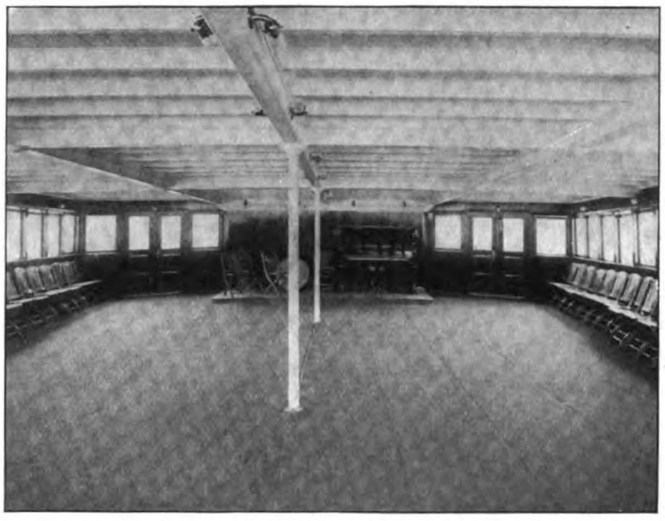
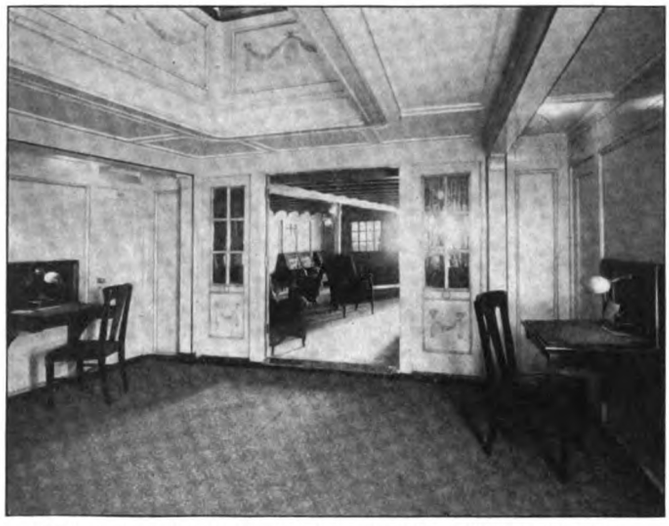
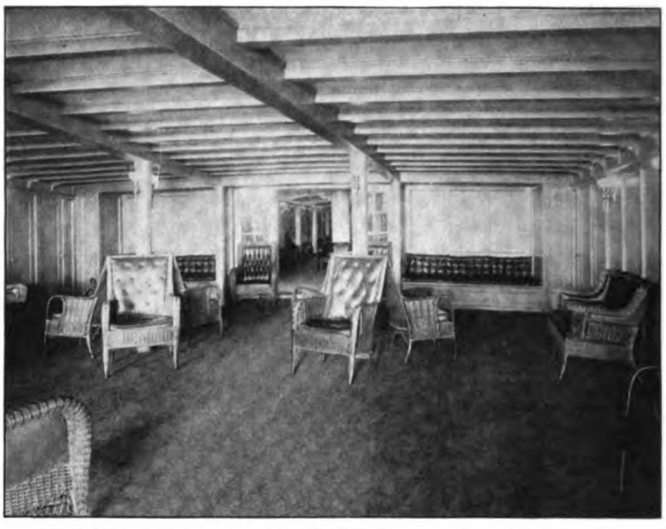


BALL ROOM AFTER END BOAT DECK LOOKING FORWARD

CHILDREN'S PLAYGROUND ON AFTER END PROMENADE DECK



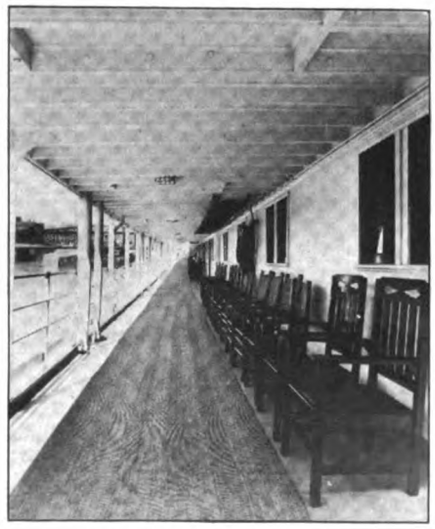
AFTER END MAIN SALOON LOOKING INTO WOMEN'S LOUNGE



WOMEN'S LOUNGE LOOKING FORWARD INTO MAIN SALOON

the dining room are located the stores, refrigerators and fresh water tanks. Aft on this deck are located the bar and crew's quarters. The bar is finished in fumed oak with tile floor. On the deck above, which is the main deck, the after part of the vessel is given over to the social hall and passengers' entrance. Leading from the social hall are the purser's room, barber shop, cafe and parcel check room. Forward of the social hall are the baggage room and accommodations for the engineer crew. The galley is located on the main deck amidships, connected by elevators and dumb waiters to the pantry and storerooms below. Forward of the galley is the lower cabin. This is surrounded by nine parlor staterooms each with private bath and fitted with double brass beds and mahogany furniture. A stairway leads directly from the cabin to the dining room below.

The main saloon on the upper deck is reached from the social hall below by the main stairway. The main saloon is finished in cream enamel and leading off from it are 128 staterooms with accommodations for 256 passengers. Separated from the main saloon by a glass partition and French doors at the after end is the ladies' cabin finished in silvered oak. Both the main saloon and the ladies' cabin are furnished throughout with leather chairs and settees. Officers' quarters are located forward of the main saloon on the upper deck, but are entirely separate. The promenade deck is given over entirely to staterooms and a covered promenade. There are 52 staterooms and 14 parlor staterooms with bath on the promenade deck. These staterooms, as shown in the photographs, open onto a gallery which overlooks the main saloon. Access to the gallery is provided by broad stairways forward and aft of the engine and stack casing. A covered promenade 9 feet wide and furnished with deck and steamer chairs, extends entirely around the ship.



PROMENADE DECK, STARBOARD SIDE, LOOKING AFT

The extreme after end of the promenade has been given over to a children's open air playground, and is supplied with all sorts of toys for the little ones. This is a very popular feature of the ship. The railing around the children's room is entirely screened

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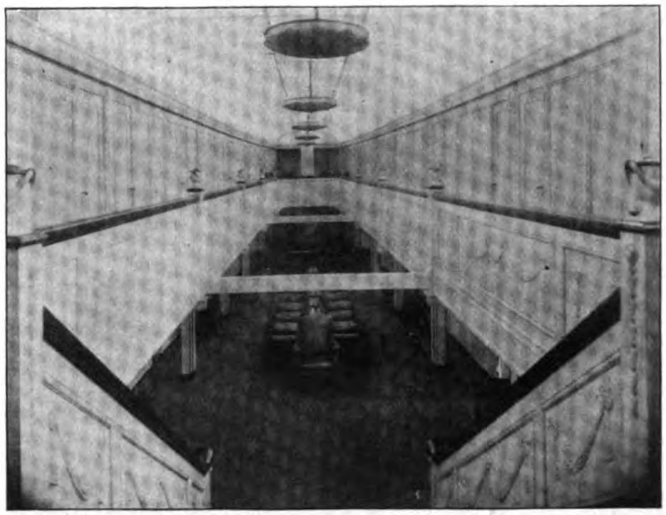
MAIN CABIN LOOKING AFT TAKEN FROM STAIRWAY JUST AFT OF BOILER CASING



INTERIOR OF MAIN CABIN, LOOKING FORWARD, TAKEN FROM STAIRWAY JUST FORWARD OF BOILER CASING

SOCIAL HALL LOOKING AFT SHOWING PURSER'S OFFICE ON RIGHT AND WIRELESS ROOM ON LEFT

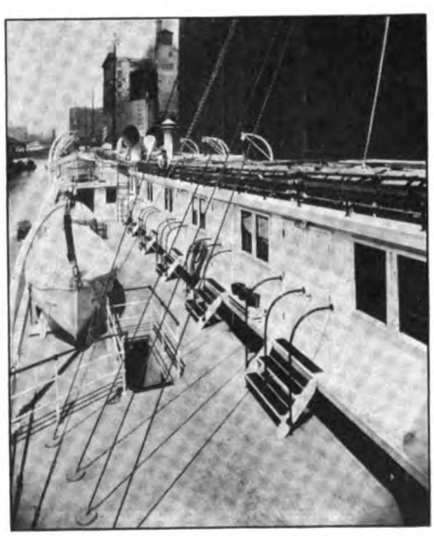
FORWARD END OF MAIN SALOON LOOKING AFT

with wire netting so that there is no possibility of accident. Swings, hammocks, and a sand pile of pure white sand prove irresistible attractions to the youngsters.

On the boat deck are 57 staterooms and eight parlors with bath. The captain's quarters are located at the forward end of this deck directly under the pilot-house. At the extreme after end of the boat deck is a glass-enclosed ball room fitted with a maple floor for dancing.

The ship, of course, is lighted throughout by electricity and the indirect system is employed in the main saloon. All rooms are cooled by mechanical refrigeration, for which purpose a 12-ton refrigerating plant is installed. All water used for domestic purposes is filtered.

The South American is fitted with a quadruple-expansion engine having cylinders 21½, 30¾, 44½ and 64-inch diameter with a common stroke of 36 inches. The high pressure and first intermediate cylinders have one piston valve each, the diameter and travel being 12 inches and 5½ inches for the high pressure and 17 and 6 inches for the first intermediate. The second



STARBOARD SIDE OF BOAT DECK TAKEN FROM BRIDGE

intermediate cylinder has two piston valves each 14 inches in diameter and 6 inch travel, and low pressure cylinder has a double ported slide valve with a travel of 6½ inches. All valves are driven with Stephenson link motion, the low pressure having a balance cylinder. The high pressure piston is a plug piston of cast iron fitted with anti-friction rings. The first intermediate piston is of cast steel fitted with a solid removable follower of iron and the second intermediate piston is similarly arranged with the exception that the piston body is of iron and purposely weighted to assist in the balance. The low pressure piston is of cast steel with packing rings and removable follower plate. All pistons are conical in section and the low pressure and first intermediate are made as light as possible. The piston rods, of open-hearth steel, are 5⅛ inches in diameter in the body, secured to the piston with a 3¾-inch nut and to the crossheads with a taper key. The crossheads are of cast steel, fitted with removable brass

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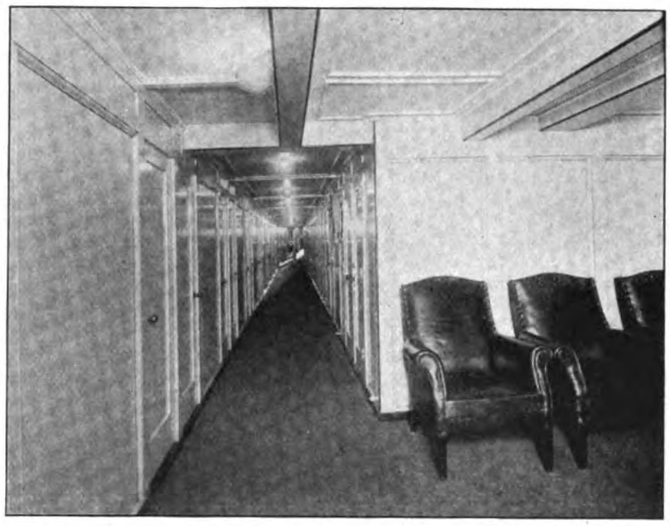
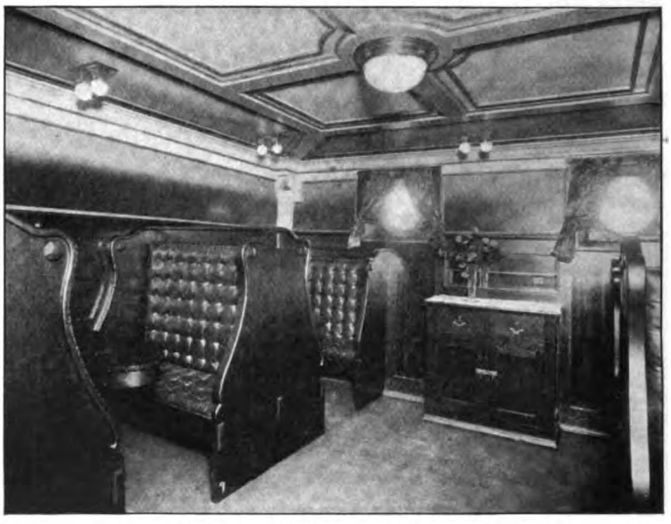
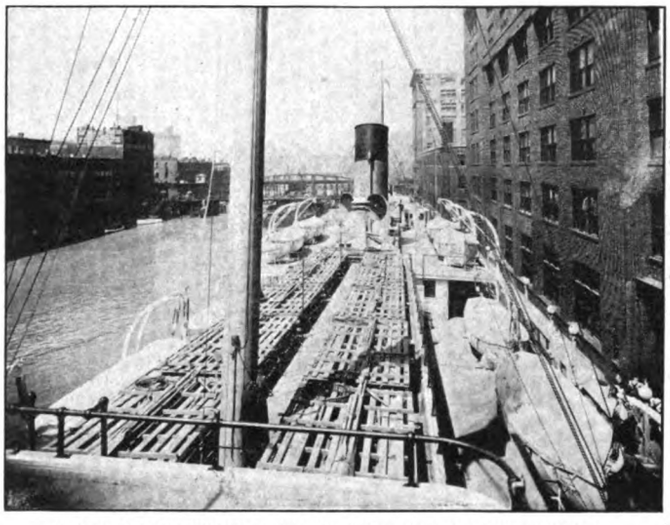


PASSAGEWAY CONNECTING FORWARD AND AFTER ENDS OF MAIN SALOON



LADIES' CAFE JUST OFF OF SOCIAL ROOM



BOAT DECK TAKEN FROM TOP OF PILOT HOUSE

VIEW OF AFTER DINING ROOM

shoes for both ahead and backing slides, while the crosshead pins are of machine steel taper fitted to the crossheads and are 6 inches in diameter by 8½ inches long.

The connecting rods are of open-hearth steel 7 feet 3 inches long center to center, with brass top end boxes, adjustable for wear with a taper wedge. The crank pin boxes are of cast steel lined with babbitt and secured to the tee-ended connecting rod with annealed steel bolts, 2¾ inches diameter and a 3-inch thread. The connecting rod body is 4¾ inches in diameter at the top and 5¾ inches at the bottom.

The crank shaft is of open-hearth steel of the built-up type with cast steel slabs securely shrunk and pinned to the shaft. The diameter of the crank shaft and crank pins is 12½ inches and the length of the crank pins 12½ inches. The shaft is supported in six journals, two of which are 19½ inches long and four 15 inches long, all lined with babbitt and having semi-steel caps secured with steel binder bolts, 3¼ inches in diameter.

The thrust bearing is of cast iron with cast iron shoes faced with babbitt and fitted for water circulation; the thrust pressure being taken up on four collars with a unit pressure per square inch of about 60 pounds.

STATEROOM SHOWING PASSAGEWAY TO SIDE OF SHIP WITH AIR PORT

The thrust shaft is of open-hearth steel 12 inches diameter with coupling and thrust collars forged on. The line shaft is also of open-hearth steel 12 inches diameter, supported in babbitt-lined, steady bearings placed at intervals not exceeding 18 feet. The tail shaft is 12½ inches in diameter in the body and 13½ inches in the stern bearing, which is 5 feet 7 inches long.

The propeller is of the sectional four-bladed type 12 feet 9 inches diameter, with a uniform pitch of 14 feet 9 inches and a developed total blade surface of 62 square feet. The hub and blades are of special mixture of tough cast iron with machine steel studs and brass nuts.

The bedplate and both front and guide columns of the engine are of cast iron box sections, all properly and securely bolted at their various points of connection. Reversing of the engine is accomplished with a direct-acting steam cylinder 10-inch bore and 15-inch

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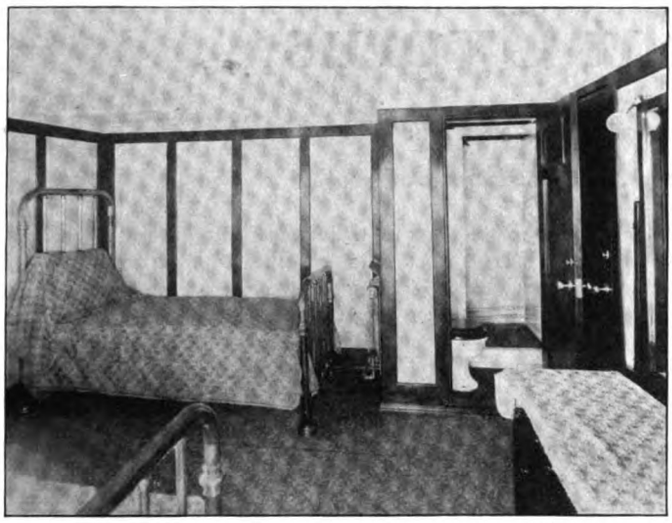
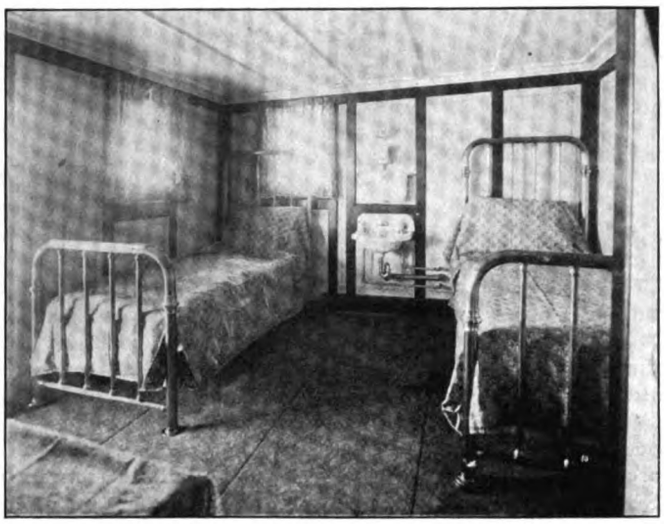
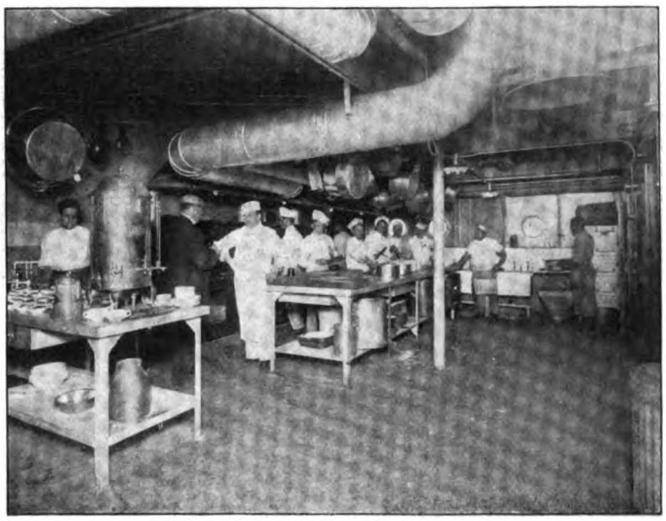


PARLOR ROOM ON BOAT DECK WITH SHOWER BATH AND TOILET



ANOTHER VIEW OF THE SAME PARLOR

STARBOARD SIDE OF ENGINE ROOM LOOKING AFT



VIEW OF GALLEY

stroke, and a double auxiliary reverse and turnover engine is provided, having cylinders 4½-inch bore and 6-inch stroke. This engine is so arranged that it automatically stops when the valve gear of the main engine has reached either full ahead or astern positions.

Steam is supplied from three boilers, 14 feet diameter by 12 feet long, allowed a working pressure of 215 pounds. Each boiler has three corrugated furnaces, 42 inches inside diameter and separate combustion chambers. The combined heating surface is 7,293 square feet and the total grate surface 157½ square feet.

All pumps are independent. The main air pump is a vertical double-acting pump of the simplex type having a steam cylinder 18 inches in diameter and 24-inch stroke, and the air cylinders, 36 inches diameter and 24-inch stroke. Feed pumps are fitted in duplicate, each pump being 12 x 8 x 12. The sanitary and fire pump, duplex 12 x 8 x 12, the bilge pump, simplex, 6 x 8 x 12, one fresh water pump, duplex, 5 x 6 x 6, one auxiliary condenser and simplex air pump, 10 x 14 x 12.

The vessel carries lifeboat and raft equipment of sufficient capacity to accommodate both passengers and crew. Her wireless equipment has a radius of 250 miles. A Schuette recording compass and Nicholson ship log are also fitted.

Contract for the construction of the new lighthouse tender Fern has been awarded to the Hall Bros. Marine Railway & Ship Building Co., Winslow, Wash. The new vessel will be 112 x 22 x 10 feet 3½ inches, and will be equipped with an Almy water-tube boiler furnished by the Almy Water Tube Boiler Co., of Providence, R. I. The engines will be built by the Heffernan Engine Works, Seattle, Wash.

Names have been announced by the Navy Department for four of the new battleships now in process of construction. Battleship No. 39 will be christened Arizona, No. 40 California, No. 41 Mississippi and No. 42 the Idaho. The old Mississippi and Idaho were recently sold to the Greek government. Bids are now being invited by the Navy Department for the construction of battleships Nos. 40, 41 and 42.

The Smooth-On Manufacturing Co., 572-574 Communipaw avenue, Jersey City, N. J., manufacturers of Smooth-On iron cements and compounds, have just published Instruction Book No. 7, devoted exclusively to the use of its iron cement for hardening, waterproofing and oil-proofing concrete. This book gives full directions for the application of the compound for brick or stone work, stopping leaks in concrete, and contains many testimonials from users of it. The book is well illustrated and will be sent to anyone upon application.

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Steam Yacht Cyprus

Description of the Extensive Alterations Which She Has Undergone Since She First Came Out

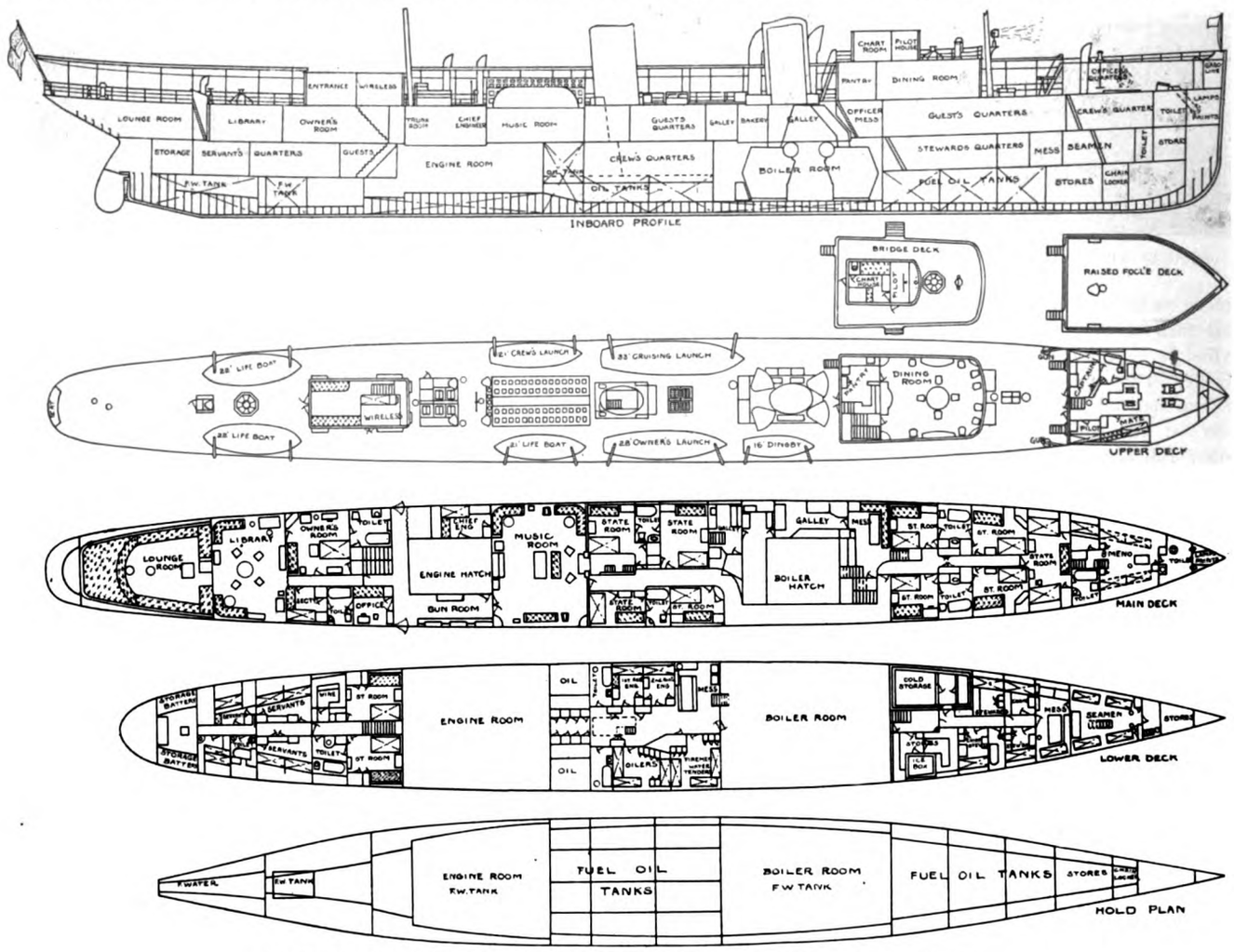
A VERY interesting undertaking in steel shipbuilding has just been successfully carried through under the supervision of Messrs. Cox & Stevens, namely, the enlargement of the seagoing steam yacht Cyprus, originally designed and built under the supervision of this firm or naval architects for Daniel C. Jackling, of Salt Lake City, Utah, the original construction as well as the alterations having been carried out by the Seattle Construction & Dry Dock Co., of Seattle, Wash.

Cyprus, as originally built, was a notably large vessel, not only being the largest steam yacht ever built on the Pacific coast, but being outclassed in size by only four steam yachts owned by Americans and built in American shipyards. The building of this vessel was in the nature of an experiment for Mr. Jackling, who expressed himself as wishing to determine by his experience with a not too large or costly yacht just exactly what he would ultimately require in the way of a larger vessel to meet his permanent needs.

With this object in view, a steamer type of hull with straight stem and elliptical stern was determined upon in order to produce the most seaworthy vessel that could be constructed, and an overall length of 231 feet was selected as being sufficient to secure the accommodation, speed and steaming radius desired.

Cyprus was consequently built on the dimensions determined and was delivered to Mr. Jackling in the summer of 1913. As the Pacific ocean, by reason of the long distances between harbors and the extremely heavy weather often encountered, is a much more trying cruising ground than the Atlantic or the Mediterranean, Mr. Jackling had serious misgivings regarding the comfort at sea under these conditions in a vessel of such relatively small dimensions as Cyprus in comparison to the regular coastwise steamers operating in the same waters. Immediately upon having the vessel turned over to him by the builders, Mr. Jackling, in company with the designers, put to sea in a heavy gale and tried Cyprus out thoroughly under conditions calculated to test her seaworthiness to the utmost. Subsequently Cyprus steamed to San Francisco, encountering heavy weather the greater part of the way, and during the late summer and fall of 1913 cruised extensively along the Pacific coast, going as far south as the entrance to the Panama canal.

During these various trips, Mr.



INBOARD PROFILE AND DECK PLANS OF THE STEAM YACHT CYPRUS

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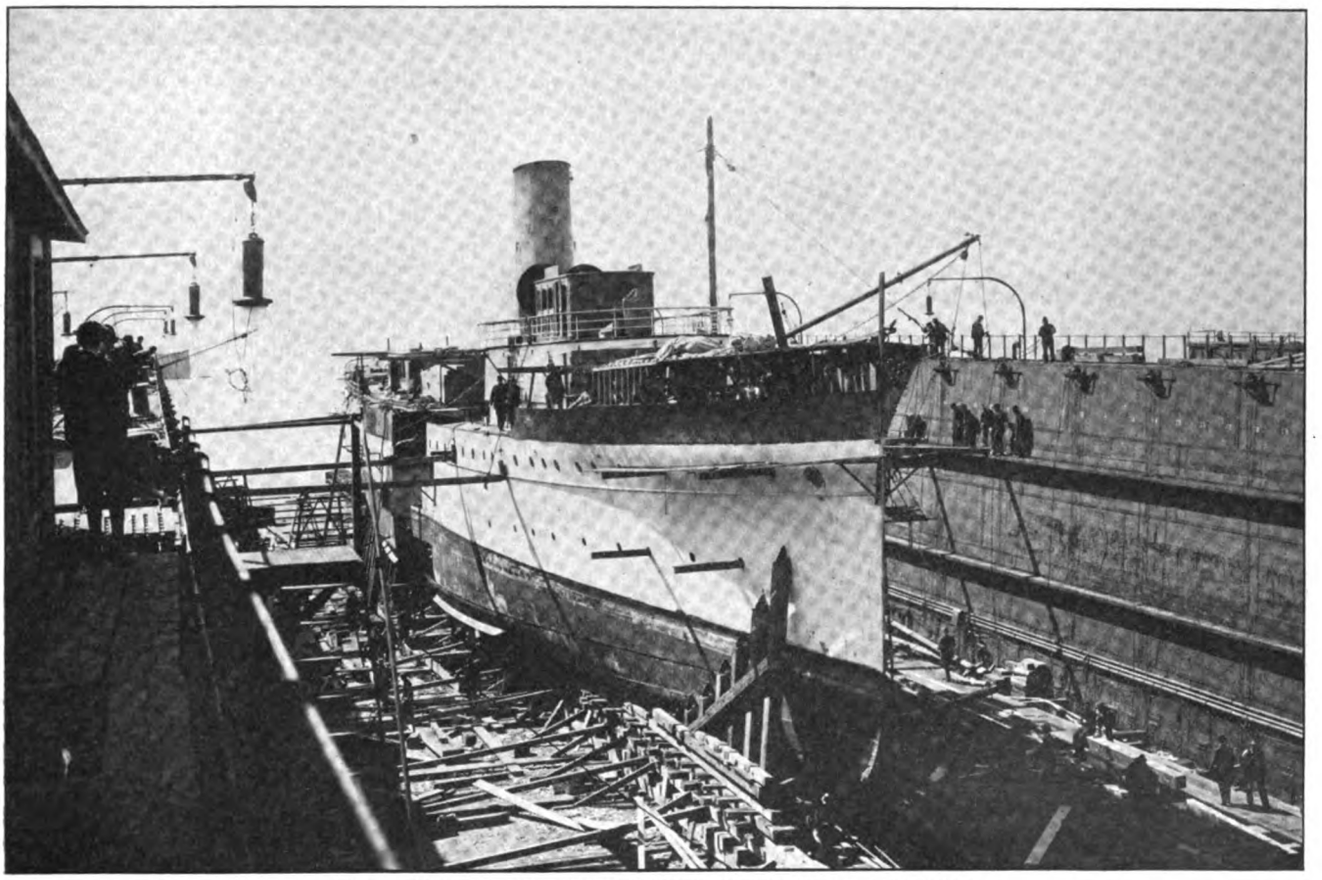
Jackling had an opportunity of comparing the seaworthiness of Cyprus with that of many much larger vessels, and expressed himself as not only entirely satisfied with her performance, but astonished at her remarkability to maintain a high speed at sea with entire comfort to those on board. In fact, he was so impressed with her successful behavior that he expressed himself as doubting whether even in a vessel of larger dimensions his architects could again secure equally good results.

At the close of the season of 1913, Mr. Jackling having definitely determined that yachting was to his liking, and having become so attached to Cyprus for the reasons stated, discussed in detail with Cox & Stevens the advisability of so lengthening the vessel as to make her amply large for his permanent requirements, instead of selling her and commencing the construction of an entirely new vessel. After careful consideration, his architects reported that by cutting the Cyprus in the middle and increasing her length by 35 feet, the increased accommodations desired could be secured, also an increased steaming radius, while the speed would not be appreciably reduced, and the altered vessel would be of excellent proportions as regards strength and seaworthy qualities. Accordingly early in the present year a contract was entered into for the lengthening of the vessel by 35 feet, which contract was successfully carried into effect within five months, a most creditable performance.

The present dimensions of Cyprus are: Length over all, 266 feet; length on the water line, 250 feet; beam, 28 feet 6 inches; extreme draft, 13 feet 6 inches.

The lines show a vessel with fine entrance and easy run, considerable deadrise at all sections, a good, hard bilge carried well toward the ends, ample freeboard and pleasing sheer, a full deck line associated with a pronounced flare forward, in fact, a form calculated to give the best results for speed and seaworthiness.



THE STEAM YACHT CYPRUS PULLED APART IN DRY DOCK

General Appearance of Cyprus

In appearance Cyprus is most striking. A raised forecastle forward, containing quarters for the captain, mate and pilots, the sides at the after end being recessed after the manner adopted by the government, in torpedo boat destroyers, a rapid-fire gun being mounted on each side in these recesses, adds greatly to the character of the forward end of the vessel. . From end to end the sides are carried up to the upper deck level in order to make it possible to maintain high speed at sea in rough weather, and to relieve the effect of this continued high side large heavy plate glass windows, one inch in thickness, are placed in all the main saloons, producing a most pleasing effect from the interior and greatly improving the exterior appearance. Two large deck houses of steel on the upper deck, the forward one containing dining room and pantry, the after one wireless room and entrance hall, are so disposed and proportioned that with the two funnels of generous size, and two pole masts equipped with wireless, a most symmetrical and workmanlike appearance is secured. Cyprus looks every inch a seagoing steamer and has so proven herself, at the same time her internal arrangements are luxurious to a degree, and have been designed with great care to secure the maximum possible comfort for officers and crew as well as for owner and guests.

The general scheme adopted in arranging the accommodations for owner and guests was, in the first place that all rooms should be large and well ventilated and have liberal bath room facilities, and in the second place, that in so far as possible, these quarters should be on the main deck. That these objects have been ob-

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tained, will be seen on inspection of the plans, which show a total of 13 large staterooms for the owner and his guests, all of them unusually liberal in size and none less than 10 feet in length, and for the use of the occupants of these rooms, nine bathrooms conveniently arranged. Of all these rooms only two are on the berth deck. On the main deck, conveniently arranged, will be found the following large living rooms:

Nearly amidships, extending the full width of the vessel, is the music room, the dimensions being 28 feet by 28 feet. This room is finished entirely in Java teak and has overhead an immense dome skylight of translucent glass so arranged with an indirect lighting system that at night an effect of sunlight is secured. This room is fitted with large windows of 1-inch plate glass and has an immense fireplace with massive overmantel, and with the numerous large divans, heavy and comfortable lounging chairs, reading tables and piano, creates an impression of being a room in some large country house rather than on a vessel.

Near the after end of the main deck is the library, also the full width of the vessel, being 24 by 16 feet in dimensions, the finish being of specially imported Thibet mahogany of a beautiful dull red color, handsomely paneled, having numerous book shelves, comfortable lounging divans, reading tables, writing desks and heavy lounging chairs, making, in fact, a room perfectly adapted for its purpose. This room is also fitted with large plate glass windows, these windows being so arranged that they may be opened in good weather, and at all times giving ample light and doing away with the shut-in feeling so often noticed in similar cases.

Library and Lounging Room

Directly aft of the library and extending to the stern of the vessel, a large lounging room has been constructed, approximately 30 by 20 feet in dimensions, the sides of the vessel at this point being left open the greater part of the distance, so that although the deck overhead and the high steel bulwarks provide ample protection against bad weather, this space is really an out-of-door room in every sense of the word. The sides of this space all the way around are fitted with comfortable cushions and springs, thus really providing out-of-door sleeping accommodations for as many as wish to avail themselves of this feature, and in addition several regular sleeping hammocks have been constructed to be hung in this space for use in extremely hot weather.

On the upper deck, as already noted, will be found forward a steel deck house containing the dining room, 24 by 19 feet in dimensions, aft of which is the pantry. The dining room is finished in sanded Java teak, left dull without any filler or varnish, and contains in addition to a massive dining room table, a very large and elaborate sideboard, two massive serving tables and four corner cupboards, the decoration of this room being Jacobean character.

On the upper deck aft of the mainmast is another steel deck house containing an entrance hall, from which access is had to the quarters below, this space being 12 by 12 feet in dimensions and finished in teak, the forward end of this entrance hall being a wireless room with a very complete equipment and accommodation for the wireless operator. An interestin gfeature in connection with the entire scheme of the quarters for the owner and his guests is that from each and every stateroom and living room access may be had to all the other living rooms and staterooms without any necessity of going out on deck, this being accomplished by cleverly arranged passages and stair-

The arrangement of the living quarters for the crew and servants has been most carefully thought out, and, notwithstanding that the total crew of 48 men has to be accommodated, unusually liberal quarters are provided forward. It was thought best to arrange the quarters for the various classes of employes all together, and this has been found to work out most satisfactorily. The valets and personal servants have quarters on the berth deck aft, where a separate bath room is provided for their exclusive use. On the berth deck amidships, in between the engine and boiler room, are the quarters for the engineers, firemen, water tenders and oilers, these quarters having a separate mess room and two well equipped bath rooms. On the berth deck away forward are the quarters for a portion of the ordinary seamen, with a separate mess room, toilet and wash room. Immediately aft of these quarters will be found the rooms of the cooks and stewards, these employes having a separate bath room for their own use. On the main deck away forward the balance of the ordinary seamen are taken care of, they having a separate toilet and wash room, the second mate also having a separate stateroom in this space. The raised forecastle contains a very comfortable stateroom for the captain, with a private bath room opening off the same, also a stateroom for the first officer and for the pilot. On the main deck amidships is situated the officers' mess, a most comfortable room, and readily accessible from the various officers' quarters. On the main deck amidships is also located the galley for the crew, a bakery and a very large, well equipped separate galley for the owner. On the main deck abreast the engine hatch on the port side is the chief engineer's stateroom, an excellent arrangement in every way.

From the preceding, it will be seen that as far as the living arrangements are concerned, Cyprus is a remarkable vessel, and the appointments of all the staterooms are most elaborate and at the same time great taste has been shown in their decoration. While in many of the rooms the general scheme is Colonial in character, the furniture, doors and trim being of mahogany and the side walls and overhead finished with white, certain of the rooms, however, being designed especially for the use of ladies, are finished entirely in ivory white, the hangings and upholstery being in delicate shades of pink or blue. The owner's room is finished in imported Thibet oak, which is a very handsome wood, having a most beautiful soft tone and being very handsomely figured. Every piece of removable furniture on the yacht has been especially designed so as to be absolutely in keeping with the other appointments, a fact which naturally adds great individuality to the living quarters. As Mr. Jackling often transacts considerable business while on board the Cyprus, he has arranged his own living quarters somewhat apart from those of his guests, and he has adjacent to his own room, which opens into a library, a large private office and a special room for his secretary.

Machinery Installation

The machinery installation is so elaborate and complicated in character that a technical description of the same would occupy too much space for the purpose of this article. It is sufficient to say that the vessel is equipped with twin screw reciprocating engines, a most modern and efficient deisgn, same being supplied by battery of Babcock & Wilcox boilers, using oil as fuel. In order to secure absolute rigidity and as an additional safeguard against accidents, the hull plating is bossed out around the outboard shafting for its full length. The auxiliary machinery is

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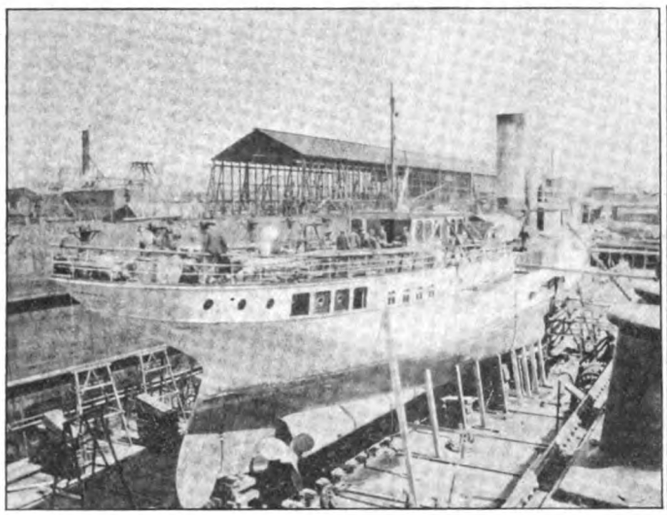
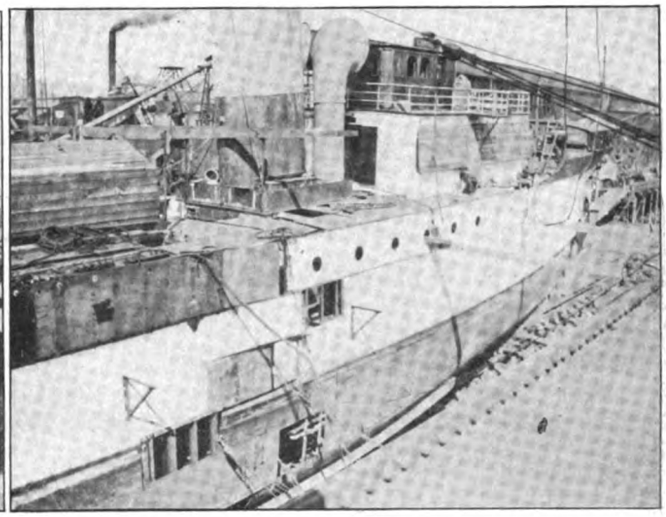


IN DOCK GETTING READY TO PULL APART



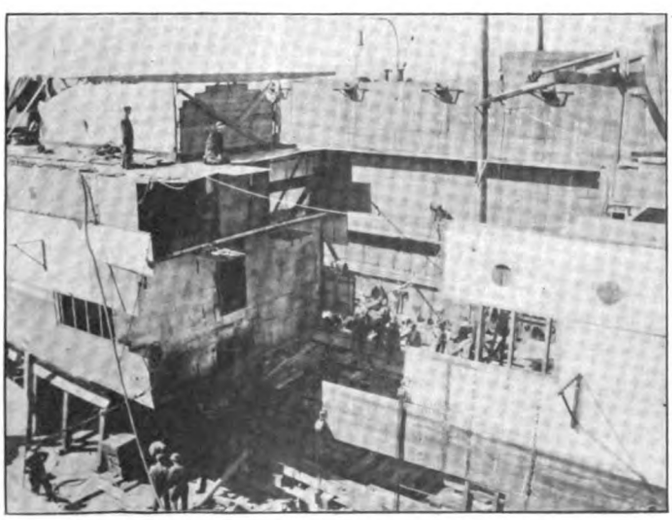
STARTING TO PULL APART IN DOCK

complete in every detail, including not only the usual and necessary appointments, steam windlass and steam steering engine, electric light plant, various winches for handling boats, an ice-making and refrigerating plant of unusual size, but also a most complete and carefully worked out scheme of forced ventilation. For cruising in the Pacific ocean in summer weather it has been found absoluately essential to provide not only the usual and natural ventilation, but also forced ventilation, so that fresh air may be secured at all times in every part of the ship, even when all ports and skylights are tightly closed. The installation of this character on Cyprus has proved notably successful. Fresh air is delivered through a series of ducts to all the living spaces in the vessel, these ducts being neatly enclosed in the panel work so that they are not visible, and the amount of fresh air being controlled by shutters in the various rooms. A most unusual feature in this connection is the fact that the supply of fresh air before being delivered to the rooms is passed through tubes in tanks through which sea water is kept constantly circulating. In this manner, air practically at the temperature of sea water can be delivered to any part of the ship, producing most comfortable conditions, even in extremely warm weather. This ventilating system was laid out by the architects, Messrs. Cox & Stevens, in conjunction with the firm of Schuttee & Koerting, of Philadelphia, who have made a study of matters of this character.

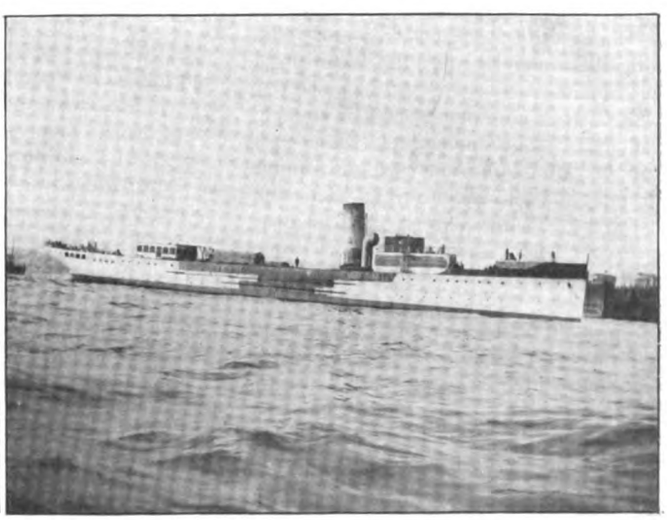
The plumbing arrangements are remarkably well planned and complete. All the bath rooms are tiled, not only on the floors but have a wainscote of tiling making a most sanitary arrangement. All the tubs and lavatories are of special massive construction and are supplied with hot and cold running fresh and cold running salt water, the toilets are of the most approved type. All except those in the crew's space have flushometer toilets such as are found in modern house plumbing, the sewerage being taken care of by special pumps in the engine room which are automatic in their operation.

Water-tight Sub-division

Another notable feature of Cyprus is the extremely satisfactory water-tight sub-division. Not only are there a much larger number of transverse water-tight bulkheads extending from the keel to a height well above the water line, but in addition, the tanks for fresh water and fuel oil are so arranged and so sub-divided as to greatly increase the safety of the ship from serious injury due to grounding or collision. The fuel oil, of which there is a total capacity of approximately 360 tons is carried in a number of tanks distributed throughout the vessel, these tanks in all cases being composed of the plating of the vessel, the transverse water-tight bulkheads and a horizontal steel deck thus vir-



PULLED APART READY TO ERECT NEW FRAMES



WHEN LAUNCHED AFTER HAVING BEEN LENGTHENED

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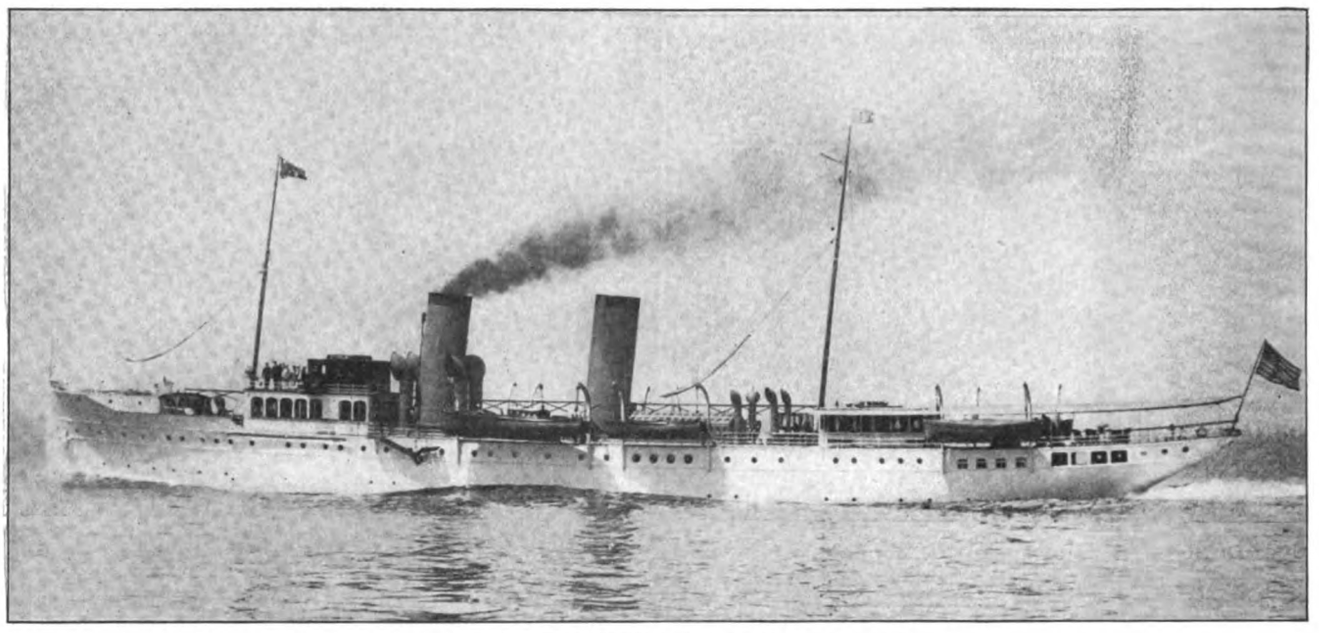

THE STEAM YACHT CYPRUS RECONSTRUCTED

tually making a series of double bottom compartments, any one of which may be pierced without in any way injuring the vessel as a whole. These oil tanks of which there are 11 are so arranged that fuel oil may be taken from any one of these tanks at will, or any tank may be when desired, filled independently of the other tanks. A further arrangement is that each fuel oil tank may when desired, be flooded with sea water, a very useful arrangement when extended cruises are being made and it is essential to maintain the displacement and trim such that the best seagoing qualities of the yacht may be retained, even when the fuel supply is very low. As in addition to the fuel oil tanks, all the rest of the hold space is sub-divided into compartments used for fresh water or for water ballast, if required when in a light condition, it can readily be understood that in this particular vessel absolute perfect seaworthy conditions can be maintained at all times, the displacement and trim being absolutely under the control of the captain.

As Cyprus now stands, she is a yacht that can steam indefinitely at better than 16 knots an hour without undue forcing and when utilizing her full power, can be driven at a speed slightly in excess of 18 knots. When cruising by the most economical speed or in the neighborhood of 12 knots she carries sufficient fuel to give her a steaming radius, in excess of 7,000 knots.

In the matter of boats and launches, the equipment is remarkably complete, not only is there a 21-foot crew's launch and an able 28-foot owner's launch, but in addition there is carried a 33-foot cruising launch for the owner's use in exploration work up rivers and waterways where the yacht itself is unable to penetrate. In addition to these launches, the yacht carries three 22-foot life boats and a 16-foot working boat or dinghy. It will be interesting to note that the fact of lengthening this vessel not only secured for the owner four large guest rooms and two bathrooms, also a very considerable amount of additional space for officers and crew, but increased the fuel capacity by 60 tons and the water capacity by 22 tons, all this having no material effect upon the cruising or maximum speed of the yacht. It can readily be understood that this lengthening was by no means a simple matter and the owner, the builders and the architects all deserve congratulations upon the successful manner in which these alterations have been carried out.

William St. John

The Safety Heating and Lighting News for July, which is the house organ of the Safety Car Heating & Lighting Co., contains an item which will be read with much interest by lake vessel owners as it relates to William St. John, who was for many years a regular attendant at the annual meeting of the Lake Carriers' Association, but whose presence has been missed from these gatherings of late years, though his memory fadeth not. The article which is illustrated with a photograph taken on Mr. St. John's last birthday, is as follows:

Seen a Prussian blue cravat,
With fourteen caret solitaire,
Hung beneath a florid face
Sparsely framed with silv'ry hair?
Chest expanded at the waist,
Lines as round as ever graced
A royal figure?—You have faced
Our William St. John.

If we could induce the dean of our sales department, William St. John, to contribute his railway reminiscences, we believe he could fill the pages of this issue;—and it would make interesting reading. "Saint," as he is familiarly known by his many friends, celebrated the 74th anniversary of his birth on June 18. Father Time evidently uses much discretion in placing his burdens on the shoulders of humanity, and knowing the "scrap" he would encounter when attempting to "put anything across" on this rugged, hale and hearty Safety Company's booster, has preserved him free from the cares of 74 years on this earth.

Mr. St. John has been connected with The Safety Car Heating & Lighting company since its organization and has helped it grow to its present size and importance in the railway field. He was boosting Pintsch light when many of us were infants, is still as ready to argue its merits, and looks and feels as though he will be shouting the praises of Pintsch mantle light for many years to come.

Captain Frederick Rouse, 2702 Hyde street, San Francisco, Cal., recently patented the Rouse sea anchor, which provides a spreading frame for an anchor adapted to maintain its operative position irrespective of added weight, and also a buoy to maintain the equilibrium of the anchor and oil and a ballasting compartment adapted to hold and distribute a liquid to affect the surface of the water in which the anchor is held when in service.

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Canadian Ship Building

Col. Miller, President of the Polson Iron Works, Discusses its Present and Future Development

IF Canadian governments and Canadian shipping interests would confine the bulk of their vessel construction to Canadian builders, every ship yard in the country would be humming with activity, thousands of new workmen would be required and enormous sums of money enlisted in home development which at present pours into non-Canadian pockets."

Lieut. Col. J. B. Miller, president of the Polson Iron Works, of Toronto, one of the leaders in ship building in this country with 800 men under permanent employment, is a thorough believer in the future of the industry even though past and present influences governing it have been anything but auspicious. What program now faces the ship building yards, what prospects for increased employment of Canadian workmen, together with other associated facts were indicated by Lieut. Col. Miller in an interview.

The American Ship Building Co., at Port Arthur, the Collingwood Ship Building Co., the Kingston Ship Building Co. and the George Davie yards at Quebec are engaged at present in repair work, with very little new construction. The Canadian Vickers yards at Montreal are at work on a new ice breaker with the likelihood of a new contract for a large government dredge which could not be built above the canals; the two latter contracts alone total about $1,500,000. The Polson Iron Works, Toronto, have recently launched a large dredge for the Canadian Stewart Co., and another is under construction, in addition to a large derrick scow. Two lighters for the Hudson Bay railway were completed during the past month and are now on their way to Hudson Bay; a third lighter was launched on July 25. In course of building are a buoy boat for the Dominion government and a 5,000-ton ferry for the Ontario Car Ferry Co., to run between Cobourg and Rochester. Since June 1, 1913, the Polson Iron Works have launched a full dozen boats of various designs. What these contracts amount to in money may be estimated by such sample quotations as $300,000 for a dredge, $175,000 for a buoy boat, while the large dredge under way at the Canadian Vickers yard runs to about $500,000.

"Looking at the hopeful signs for ship building in Canada," observed Lieut. Col. Miller, "one must recognize the valuable impetus to be derived from the deepening of the new Welland canal to 25 feet. That will necessitate an immediate deepening of Canadian lake harbors and a construction of new docks; old docks cannot be adapted to the new standard by merely cutting their foundations lower for that would cause a cave-in. The public works, like canal, harbor and dock building during the next 10 years must of necessity be enormous, placing heavy demands for new vessels of all sorts; nor will the life of such vessels probably be greater than the duration of the work on which they will be engaged.

"While the Great Lakes carrying trade in lumber must continue to decrease, the amount of transportation by water in coal, iron, cement, etc., is going up by 'leaps and bounds'. The carrying of our western grain crop forms, of course, the main source of profit and the possibilities of development along this line are scarcely computable. Probably few people are aware of the increase in package freight business between Montreal and Port Arthur. About 25 boats of the 2,000 to 3,000-ton class leave Montreal every month with package freight consigned to various points up the lakes. It is a profitable branch of transportation, too, although of necessity it is confined to the smaller vessels. How the expansion of our Canadian cities places fresh requirements for shipping facilities may be noticed any day in Toronto harbor where three vessels are permanently occupied in supplying the city builders with the single commodity of sand. These and many other evidences of the future growth of water transportation establish the faith of Canadian ship builders that under proper conditions the construction of vessels must become one of the great industries of the country.

"The deepening of the Welland canal will free us from the present handicap of tendering only on large vessels this side of Lake Erie. Obviously we shall be subjected to competition by builders on other of the lakes, but we welcome the chance to tender in a wider market.

"Today the ship building industry in Canada is obliged to submit to enough unfair conditions to smother the life out of enterprises with less optimism and tenacity. Recently the Canadian government endorsed the policy of confining their vessel orders as much as possible to Canadian yards, but in the past British yards have taken the cream of the orders even from governments committed to develop our home industries, and Canadian companies in the passenger and freight business have frequently shown a total absence of concern for their native ship yards. No less than 105 ships from 500 to 12,000 tons on Canadian Register in 1913 were found to have been built in Great Britain, while 41 additional vessels, all above 700 tons, were owned in Canada and operated on the Great Lakes but built and registered in Great Britain. Supplementing this heavy list of non-Canadian built ships were 34 ships built in the United States and entered on Canadian Register. This made a total of 180 vessels, which were constructed outside of Canada and which could have been produced in this country on a basis quite as efficient, even if higher Canadian wages compelled a better price.

"The Great Lakes and St. Lawrence fleet of steel steamships is today overwhelmingly American—about 92 per cent; about 4 per cent of the total tonnage is owned in Canada and 4 per cent in Great Britain. Of approximately 90,000,000 tons of freight carried up and down the lakes the volume carried by Canadian built ships was almost inconsequential.

"How serious is the handicap imposed on Canadian shipping needs only a glance at the scheme of protection adopted by the government of the United States. An American-built ship passing into Canadian ownership pays an average duty of 27 per cent. But a Canadian or British-built ship cannot be imported into the United States on any consideration whatever. It is not a question of high duty but a straight prohibitory law, the United States government taking the position that in return for the stringent protection granted to American coastwise marine, the American ship building industry must be guaranteed the largest possible measure of support. Under such legislation, shipping and ship yards

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in the United States have progressed splendidly.

"Canada, however, has discounted the prosperity of her own citizens by admitting to full privileges of the coastwise trade at least 34 American-built vessels now in active operation between Canadian ports while, nominally, Canadian coastwise shipping is protected, oceanic privileges have been granted to Norwegian and other vessels, while American vessels are permitted periodically to appropriate what they can of the lake trade."

The present system of bonuses for ship building in Canada was founded on the requirements of the days of cheap wooden vessels so that a maximum amount of $1.15 per gross ton is all the builders receive from the public treasury. Against this negligible amount they face free trade in British-built ships and are obliged to pay about 68 per cent higher wages than British and Irish private-owned yards and from 70 to 80 per cent higher than British government dockyards.

Battleship Nevada

The Latest Dreadnaught of the American Navy is Launched at Fore River

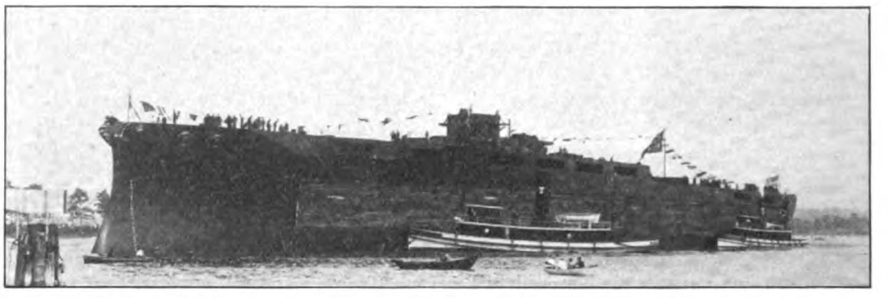
THE battleship Nevada was launched from the yard of the Fore River Ship Building Corporation, Quincy, Mass., on July 11, being christened by Miss Eleanor Anne Siebert, the ten-year-old niece of Gov. Oddie of Nevada.

The battleship Nevada and her sister ship the Oklahoma are 500 tons larger than their immediate predecessors the New York and Texas. The principal dimensions are:

Length overall ...583 feet
Beam ..... 95 feet 2⅝ inches
Mean draft ..... 28 feet 6 inches

On this draft the displacement will be 27,500 tons.

The Nevada will be driven by Curtis marine turbines. The boilers will be fired exclusively with oil and the vessel will carry no coal. The estimated speed is 20½ knots but it is probable that this will be considerably exceeded. The armor and armament of the Nevada are considerably in excess of any of her predecessors and involves a new departure for the United States navy in the arrangement of the main battery of 14-inch guns. This battery is arranged in four turrets, two turrets having two guns each and two turrets, No. 1 and No. 4 respectively carrying three guns each. This arrangement will give a concentration of fire superior to that obtainable from the ten 14-inch guns of the New York and Texas which are mounted in five 2-gun turrets. The new 14-inch 45-calibre gun is a far more powerful weapon than the 45-calibre 12-inch gun mounted on the Delaware and North Dakota. The muzzle energy of the 12-inch gun is about 49,000 foot tons whereas that of the 14-inch gun is about 66,000 foot tons. Moreover its shell, which weighs 1,400 pounds as compared with the 870-pound weight of the 12-inch carries a much larger bursting charge of high explosives and, therefore, will be proportionally more destructive.



THE BATTLESHIP NEVADA IMMEDIATELY AFTER LAUNCHING

The principal interest in this new ship lies in its great defensive power, not only will it carry a much greater weight of armor than has been carried or is to be carried by any ships built or building, but the armor will be disposed to greater advantage. The belt armor, or that which protects the waterline, will be 17½ feet wide and at mean draft will extend from 9 feet above to 8 feet 6 inches below the water. It will be 13½ inches thick and will extend for a length of 400 feet along each side. There will be two protective decks, the lower one 1½ inch thick on the flat and 2 inches on the slope. The gun deck, which is really an upper protective deck will be 3 inches thick, these two decks providing an excellent protection against plunging fire and also against fragments of shells which might be exploded in passing through the ship's plating in wake of the gun deck. The armor of the barbette will be 13 inches thick and the armor of the two gun turrets will be 16 inches thick on the face and 18 inches thick on the three gun turrets, the sides being 9 inches and 10 inches thick, while the roof is 5 inches thick.

JOSEPHUS DANIELS, SECRETARY OF THE NAVY; MISS SIEBERT AND GOV. TASKER LOWNDES ODDIE, OF NEVADA

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Sanitation Aboard Ship

The Work Which the Lake Carriers' Association is Doing is Attracting National Attention

THE work which the Lake Carriers' Association has been doing during the present summer along the line of sanitation has attracted national attention, and many requests have been received for the circulars which it has sent to the various supply houses and the vessels upon this subject. The reports which have been received from the various ports are very favorable in the great majority of cases to the dealers. Among the more enterprising improvement has been marked, which is a matter of much satisfaction to vessel owners. There is no doubt whatever that the dirty grocery store is a great menace to public health, and the Lake Carriers' Association in demanding a certain standard of cleanliness is only doing its duty to the men aboard ship, for while not directly an employer of labor, it does through its members employ under normal conditions about 12,000 men.

INTERIOR OF ONE OF THE SUPPLY STORES SERVING THE LAKE CARRIERS' ASSOCIATION

It is quite clear from the interest provoked that a nation-wide movement in behalf of cleanliness is being projected. It is not sufficient that food should be pure; it is equally important that it should be clean. It is only a little while ago when no attention whatever was paid to the common house fly. He was regarded as an annoyance but nothing more, whereas a moment's reflection would have taught any one that his unspeakably filthy habits made him a dreadful menace. Undoubtedly many epidemics of typhoid of unknown origin could be traced to the fly. There is very good reason for swatting the fly and for abolishing his breeding places. This campaign should be prosecuted by every citizen until there is not a fly left to swat.

ANOTHER VIEW OF THE SAME STORE

Shylock speaks of the cat as a harmless, necessary animal. The cat may be all very well in the home but it has no place in a grocery store. Grocery stores that harbor cats are unfortunately all too common. The cat must go.

The Lake Carriers' Association is inspecting quite thoroughly the supply houses at the various ports, but what is really needed are uniform state laws on the subject. At present some states have good dairy laws covering cleanliness in creameries and stables, but have no law whatever regarding food in stores and restaurants. This is one of the problems of the future. There should be a uniform law in every state providing for frequent inspection by the public health service. This can be brought about by a liberal education of the public on the subject. The state of Illinois, through its state health department, has ten requirements for groceries as follows:

1. Screening against flies.
2. Condition of basement and other storeroom as regards dampness and

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opportunities for contamination of goods.

3. Protection of dry bulk foodstuffs from dust, flies, rats, mice and dirty hands.

4. Cleanliness in walls, floors, utensils and refrigerators.

5. Exclusion of dogs and cats.

6. Better protection for goods now stored in stationary bins under the back-shelving or counters or unprotected under the counter.

7. Toilet facilities.

8. Protection from flies and dirt on fresh fruits, vegetables, figs, dates, honey and other articles to be eaten without cooking.

9. Non-employment of diseased persons.

10. Discouraged spitting on the floor.

Every enterprising grocer should be eager to comply with these ten requirements. The photographs accompanying this article were taken in the store of Charles Lamy & Sons, Buffalo, one of the dealers supplying vessels of the Lake Carriers' Association, and certainly leave little to be desired in the way of cleanliness.

Lake Ship Construction

An Article in the Toronto Mail Starts Some Very Interested Discussions in Lake Circles

THE *Toronto Mail and Empire* recently published the following item from its London correspondent:

"The heavy losses caused by the November storms on the Great Lakes still forms a subject of discussion in marine underwriting circles here, although the bulk of the liability has had to be borne by the American market owing to the refusal of Lloyds and the British companies to accept the risks at low premiums. The hope is now expressed that as regards the classification of the steamers employed, the requirements of Lloyds Register will be adopted as extensively as those for ocean-going vessels, some of the boats at present employed being, it is feared, lacking in longitudinal strength. In fact, the rules of Lloyds for lake steamers were formulated after a careful investigation of the conditions under which they are usually employed, and it is believed that if they were more generally observed the disasters would not occur on such a large scale again. If not, it is likely that insurances will in future be difficult to effect, on this side at all events."

The *Canadian Railway and Marine World* asked J. M. Smith, manager of the Collingwood Ship Building Co. for his opinion on this subject and he replied as follows:

"It is quite true that many of the ships built in the American shipyards on the Great Lakes are not built as strong as Lloyds requirements call for. There are a number of ships, however, that are built quite as strongly as Lloyds rules call for, and most of the latter are classed in the Great Lakes Register, which is an offspring of Bureau Veritas, which might be termed French Lloyds. We have found that the requirements of the Great Lakes Register are very complete, and the given dimensions of materials are very intelligently worked out, and ships built to class in this register are quite up to any requirements of British Lloyds. There are some ships built on the lakes that are classed in Lloyds Register, they are good ships, but they are not any better nor any stronger than the ships that are classed in the Great Lakes Register. It would be much better in the long run for the shipowners if all ships were built equal to the requirements of some good classification society. I believe it is true that some of the ships that were lost may not have been built quite up to the requirements of such classification societies, but the majority of them were good ships. Some of the older ships may have been lacking in longitudinal strength, but I think that the most of the ships that have been built on the lakes in recent years are quite strong enough for the requirements of the service.

"The steamer Wexford, which was lost off Goderich, was built to class in Lloyds Register, and although she was an old ship she had been repaired and rebuilt until she was a good sound ship. I believe that the Regina, which was lost at the same time, was built to class in the British Corporation. The James Carruthers, which was lost somewhere above Goderich, was built to the highest classification of the Great Lakes Register, and was, without doubt, the strongest built freight ship on the Great Lakes, and it was not want of strength that caused any of these three ships to founder. They were all fitted with good machinery, and had plenty of power, but, no doubt, they met a condition out on Lake Huron that could not be compared with ordinary heavy gales, possibly they encountered something of the nature of a cyclone sweeping down the centre of the lake.

"The shipping trade on the Great Lakes has developed a distinct type of ship where large cargoes are carried on a moderate draught of water. The ships are built for a moderate price and are operated at a moderate cost, they are very suitable for the trade, no doubt, however, many little improvements will be added to them from time to time.

"I do not think that the ships that foundered in the storm last November were lost through carelessness on the part of the owners, or on the part of the officers or crews. My own belief is that they encountered an unusual storm, and the high winds, combined with an extremely violent snow storm and zero weather, made a combination that was almost impossible to contend with, and I think all of those ships would have reached port safely if they could have turned around and run before the storm, but, unfortunately, Lake Huron narrows down to about a quarter of a mile wide where it enters the St. Clair River at Port Huron and the waters are shoal for a good many miles before entering the river, and the ship masters knowing this would not dare to run for the river, and, no doubt, they turned to fight it out. Possibly the ships were thrown in the trough of the sea, and if so they would have little chance of recovery.

"We have built over 40 vessels here during the past 12 years, and they were all built equal to Lloyds requirements. The most of them have been for service on the Great Lakes, and a few for service on the sea coast."

Another man, apparently very well posted in lake affairs, but whose name is not given writes the *Canadian Railway and Marine World* as follows:

"There is nothing in the statement of the *Mail and Empire's* London correspondent. So far as I have heard, and I would be certain to hear of it, there has been no question raised yet by the underwriters in connection with the seaworthiness of lake steamers, either Canadian or United States, as they recognize that, with exceptional storms, there is always danger of ships being lost, and it is that risk which

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enables the underwriters to get business.

"Regarding the question of longitudinal strength, there has been no evidence so far that any of the ships which came to grief on the lakes in the storm of Nov. 9 were lost through lack of longitudinal strength. On the contrary, so far as I can learn, none of the ships failed in this respect while they were afloat, and any ships, when loaded, no matter how strongly they are built, are liable to break if thrown up on the rocks in a seaway, and bearing probably amidships with the two ends hanging, giving the same effect as bending a stick over you knee. Any evidence which has developed so far would indicate that the ships were more likely to have been lost from their hatches, or deck houses, or both, and the evidence would seem to be very strong on these two points, although nothing is known definitely, and never will be known probably, regarding the ships which foundered, but with those which were thrown up on the beach, these are the two points which suffered most.

"Regarding the classification of ships on the lakes, just as on the ocean, they are not classed exclusively by any one classification society. I believe there are eight United States lake freight vessels classed by Lloyds Register, and it would be very difficult for Lloyds, or anyone else, if not impossible, to show that any one of these is stronger as far as longitudinal strength is concerned than was the steamship James Carruthers, which was classed by the Great Lakes Register of Cleveland, a classification society approved of and controlled by the United States underwriters. The majority of the vessels on the Great Lakes, especially those built in Britain, were classed by Lloyds and British Corporation. The balance of the vessels on the lakes, I believe, are in the majority of cases classified by the Great Lakes Register of Cleveland. A great deal of nonsense has been written in connection with these losses by people who do not know what they are writing or talking about, and you can quite understand that Lloyds are anxious to class all the vessels possible, as there is a fee in it for them, just as the wireless companies have been trying to make capital out of that storm and get more vessels to equip with wireless outfits, but, although I have asked the representatives of one of the wireless companies to give me the name of any ship which received any warning by her wireless of that storm of Nov. 9, and avoided the storm as a result of that warning, they have failed up to date to give me the name of any ship."

American Register for Foreign Ships

The Senate has passed the Underwood bill admitting foreign-built ships over five years of age to American register provided they are owned or purchased by American citizens. The Senate amended the bill so as to allow these ships to engage in coast to coast service, as proposed by Senator Jones, but the Saulsbury amendment which would have permitted these ships to engage in port to port commerce on both Atlantic and Pacific seaboards was withdrawn by Mr Saulsbury only to be offered by Senator Williams in conference. The bill reads:

"Sec. 4132. Vessels built within the United States and belonging wholly to citizens thereof; and vessels which may be captured in war by citizens of the United States and lawfully condemned as prize, or which may be adjudged to be forfeited for a breach of the laws of the United States; and seagoing vessels, whether steam or sail, which have been certified by the Steamboat Inspection Service as safe to carry dry and perishable cargo, wherever built, which are to engage only in trade with foreign countries or with the Philippine Islands and the islands of Guam and Tutuila, being wholly owned by citizens of the United States or corporations organized and chartered under the laws of the United States or of any state thereof, the president and managing directors of which shall be citizens of the United States, and no others, may be registered as directed in this title. Foreign-built vessels registered pursuant to this act shall not engage in the coastwise trade: Provided, that a foreign-built yacht, pleasure boat, or vessel not used or intended to be used for trade admitted to American registry pursuant to this section shall not be exempt from the collection of ad valorem duty provided in section 37 of the act approved Aug. 5, 1909, entitled 'an act to provide revenue, equalize duties and encourage the industries of the United States, and for other purposes'. That all materials of foreign production which may be necessary for the construction or repair of vessels built in the United States and all such materials necessary for the building or repair of their machinery and all articles necessary for their outfit and equipment may be imported into the United States free of duty under such regulations as the secretary of the treasury may prescribe: Provided further, That such vessels so admitted under the provisions of this section may contract with the postmaster general under the act of March 3, 1891, entitled 'an act to provide for ocean mail service between the United States and foreign ports, and to promote commerce', so long as such vessels shall in all respects comply with the provisions and requirements of said act.

"Sec. 2. The President of the United States is hereby authorized, whenever he shall find that the number of available persons qualified under the now existing laws and regulations of the United States to fill the respective positions of watch officers on vessels admitted to registry by this act is insufficient, to suspend by order, so far and for such time as he may find to be necessary, the provisions of law prescribing that all the watch officers of vessels of the United States registered for foreign trade shall be citizens of the United States.

"Whenever, in the judgment of the President of the United States, the needs of foreign commerce may require, he is also hereby authorized to suspend by order, so far and for such length of time as he may deem desirable, the provisions of the law requiring survey, inspection and measurement by officers of the United States of foreign-built vessels admitted to American registry under this act.

"Under like conditions and to like extent the President of the United States and the secretary of the navy are hereby authorized to direct that the navy yards of the United States, and all of their equipment and dockage facilities, be used for the purpose of repairing and keeping in a seaworthy condition all merchant vessels now or hereafter registered under the American flag, under such conditions as in their discretion are just and equitable: Provided, That such additional use of said navy yards and their equipment shall not in any way interfere with the paramount purposes of the navy of the United States.

"And the President is hereby authorized, whenever in his judgment the needs of domestic trade require, to suspend by order, so far and for such length of time as he may deem desirable, the provisions of law confining the trade from points on the Atlantic coast to points on the Pacific coast, and from points on the Pacific coast to points on the Atlantic coast to American ships.

Senator Williams' amendment was then added in conference to include coastwise trade.

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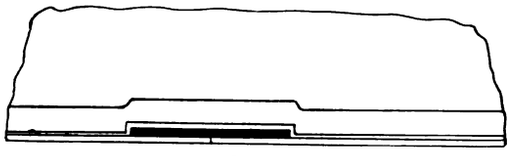
Isherwood System of Construction*

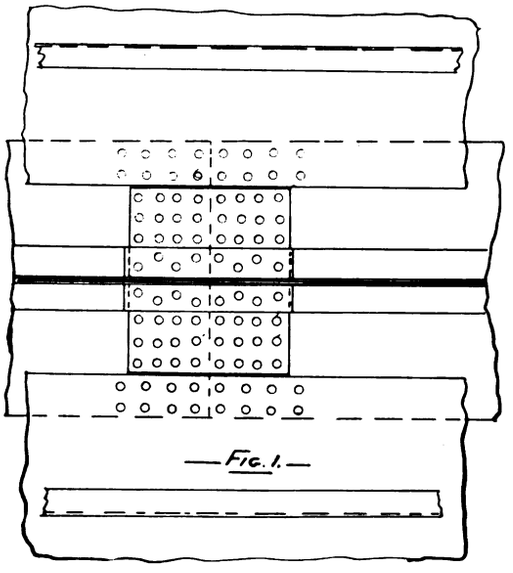
In Which the Author Considers the Subject of Butt Straps and Laps

By Robert Curr

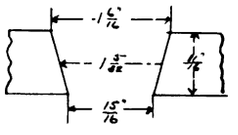
BUTT straps may become of little value if they are not of the proper thickness. The countersunk strap must be thicker than one not countersunk. Fig. 4 shows a countersunk hole in the plate or faying surface 1 6/16 inches is the width of the countersink, 1 5/32 inch is the mean diameter. If the butt strap was on the outside of the plate and the full width of the plate the thickness would be such so as to make up for the countersinking of the butt strap. Fig. 1 shows the keel plate, keel angles, center girder plate, butt strap, garboard strake and longitudinal frames on both sides.



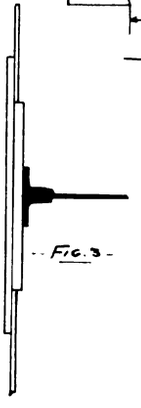
— Fig. 2 —



— Fig. 1. —



— Fig. 4. —



— Fig. 3 —

The butt strap is inside and cut short the width of the garboard strake laps, the difference being made up in the thickness of the strap.

The area of the keel plate is 16.065 square inches and to find the thickness of the butt strap required, the width of the strap minus the rivet holes into the area of the keel plate will give the thickness of same. Example: Butt strap is 27 inches, less 8 inches for rivet holes equals 19 inches.

$$\frac{16.065}{19.000} = .86 \text{ inch.}$$

An outside strap on the keel plate would save a lot of work on the inside but there is a strong objection to having it so. If the vessel be confined to draft there would be a loss in carrying; in a vessel of this size about 12 tons. The projection of the strap in a case where the vessel was to rub on the bottom would injure the strap.

In order to have the keel smooth several arrangements are adopted. Figs. 1, 2 and 3 show an economical arrangement for fitting the keel angles over the butt straps, costing on this vessel about $14.

Fig. 5 shows an arrangement sometimes adopted but it is more costly and adds weight to the vessel. The butt straps being .86 inches thick a strip 9 inches wide and the same thickness is fitted between the straps forming a level surface for the keel angles. It increases the length of the rivets which is not encouraged in ship work.

To accomplish this it requires for a vessel of this size 6,000 pounds of steel at a cost of $180.00 and the vessel would carry three tons less cargo. Fig. 6 shows an arrangement where a tapered liner is fitted and appears economical but there would be about 500 pounds of material in the liners costing with the forge work $20.00.

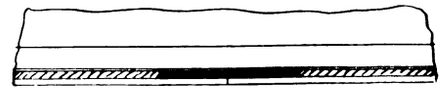
Fig. 7 shows an arrangement where the butt strap is thinned down by machine and would cost about the same as the joggled angles Fig. 2. In this arrangement the butt strap would be made thicker to make up for reducing the middle of the strap inway of the keel angles.

The keel angles shown by Figs. 6 and 7 would require to be shaped to suit the offsets made by the liners and tapering which adds to the expense. The arrangement shown by Figs. 1 and 2 is considered the most economical and the preferable for this work.

Figs. 8 and 9 show butt arrangement on the shear strake, there are two plates forming a double butt strap as shown by Fig. 9, the inside strap being fitted

— Fig. 7. —

— Fig. 6. —



— Fig. 5. —

*This is the fifteenth of a series of articles on the Isherwood system of construction which began in the September, 1912, issue of THE MARINE REVIEW. The first article dealt with the general specifications of the steamer, the second with the sheer, half-breadth and body plans; the third explained the method of getting the sheer; the fourth dealt with the longitudinal and transverse framing; the fifth with offsets; the sixth with the shell plating; the seventh with the shell plating expansion; the eighth with the arrangement of plates and angles forming the spar deck; the ninth with the transverses; the tenth with bulk head construction; the eleventh with the connection of longitudinal frames to the bulkheads and transverses; the twelfth showed the interior framing between the tank top and spar deck; the thirteenth showed the amount of work that can be put together in a Great Lakes ship yard in a few hours; the fourteenth showed details of riveting in shifts of butts.

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between the deck and first longitudinal frame below the shear strake. The shear strake is 48 inches by .526 inches and by deducting 9 inches for rivet holes at bulkhead there is an area of 20.5 square inches equal to 533 tons.

$\frac{533}{15} = 36$ Rivets ⅞ inch diameter.

Fig. 8 shows 16 rivets in double shear and 14 in single shear amounting to 642 tons which is more than necessary but it is no more costly than the single butt strap for there are eight rivets less than there would be in a single butt strap arrangement.

Fig. 10 shows a lap arrangement which is very much cheaper than the butt strap as there is only half the number of rivets and half the material.

Fig 11 shows a double butt strap arrangement on the stringer plate which is 72 inches by 9/16 inches thick. There are 12 rivet holes across the bulkhead leaving 60 inches by 9/16 inches = to 34 square inches 884 tons:

$\frac{884}{15} = 59$ Rivets for single shear. In the butt strap there are 28 rivets in double shear and 19 in single shear, making a total strength of rivets of 1,041 tons.

The lapped butt arrangement in Fig. 11 has 62 rivets single shear which shows the most economical arrangement for there is only half the material and 32 less rivets.

A quadruple riveted butt with a single strap could be arranged but the lapped butt is the cheapest arrangement.

A single butt strap for the stringer plate would be .70 inch and for double strap .42 inch countersunk and under strap .34 inch thick.

The width of butt straps run 25 diameters for quadruple riveted, 19 diameter for treble, 13 diameter for double and 7 diameter for single. Lapped butts require for quadruple 14 diameters, treble 10½, double 7 and single 4 diameters.

Double seam laps are 6 diameters of the rivets.

Single seam laps are 3½ diameters of the rivets.

At the recent convention of the National Association of Steam Engineers held at Providence, R. I., the Johns-Manville Co. had an interesting exhibit of power plant material. A new packing called J-M Seigelite attracted attention. This is a fibrous material treated so that it is said to be unaffected by the action of hot or cold water, oils, grease, gasoline, benzine or air. It contains no rubber or rubber substitutes. When immersed in water it is said to become extremely tough, resembling rawhide.

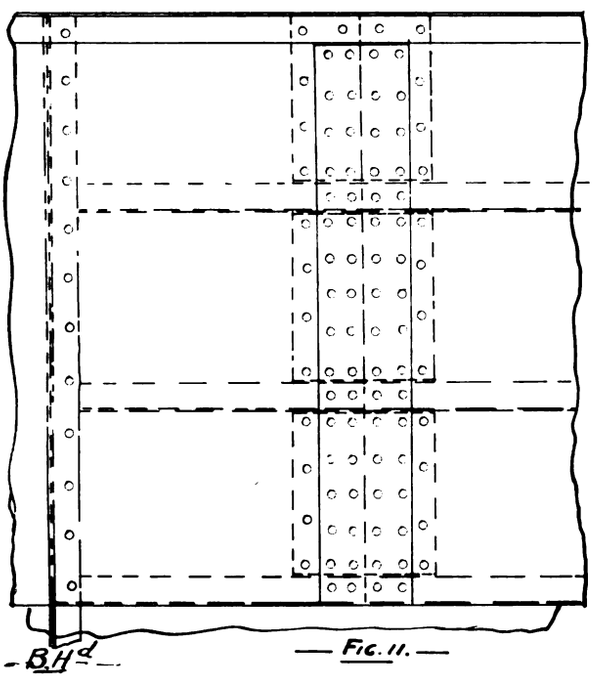

Fig. 11.

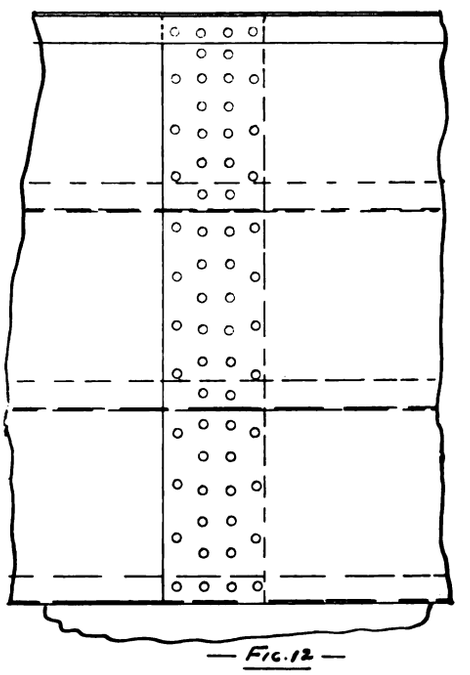
Fig. 12

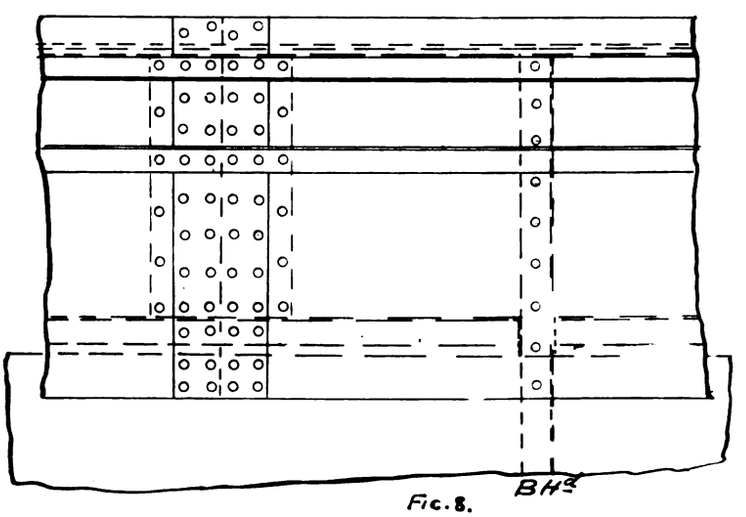

Fig. 8.

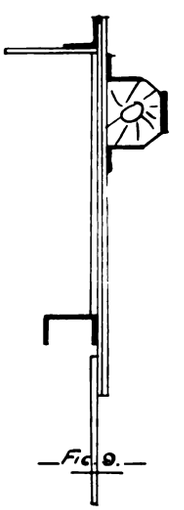
Fig. 9.

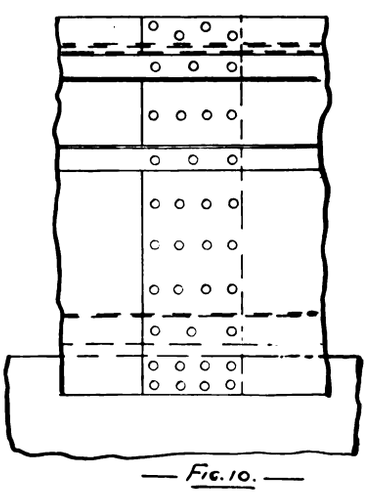
Fig. 10.

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Triple Screw Liner Statendam

The Holland-American Line Will Soon Have Another Splendid Steamer in its New York-Rotterdam Service

ON Thursday, July 9, the palatial triple screw passenger and mail steamer Statendam, built to the order of the Holland-America Line for their service between Rotterdam and New York, was launched by Harland & Wolff, Ltd., at Belfast. The history of this famous line is a record of uninterrupted progress and development, and the addition of this leviathan to their fleet signalises an even greater advance than anything previously recorded, the new vessel being nearly 770 feet in length over all and over 86 feet beam, with a gross tonnage exceeding 33,000 and a displacement of 44,000 tons. The Statendam has been built to the highest class at Lloyds, and under survey of the British Board of Trade for passenger certificate, also to meet the requirements of the Dutch and American laws. The structure of the hull is exceedingly strong. The double bottom extends right fore and aft, and there are eleven water-tight bulkheads carried up to the bridge deck at the fore part of the vessel and the saloon deck at the after part. There are nine steel decks. The vessel will have three funnels and two steel pole masts, fore and aft schooner rig, four derrick posts, and 25 steel derricks, electric winches, and Harland & Wolff's steam steering gear controlled by telemotor from the navigating bridge. Needless to say, there will be a complete installation of electric light, also emergency lighting, and wireless telegraphy and submarine signalling apparati will be fitted. The arrangements generally for working ship and cargo will be of the most complete character.

Passenger Accommodation

The passenger accommodation in the vessel will be in the owners' well known sumptuous style, over 3,000 passengers in all being provided for—800 first, 630 second, and nearly 2,000 third class. The first class passengers will be accommodated in one-berth, two-berth, and three-berth rooms; the second class in two and four berth rooms. The first class public rooms include dining saloon, on saloon deck, reading and writing room, lounge and palm court, smoke room and verandah, all on the upper promenade deck, and gymnasium on boat deck. The forward stairway will have two passenger elevators serving six decks. The first class staterooms include 32 en suite rooms on the lower promenade deck, the other staterooms being arranged on the upper, saloon, bridge and lower promenade decks, there being a very large number of one-berth rooms. Many of the first class staterooms are arranged on the tandem principle, securing natural light and ventilation to each. A feature of the vessel is the number of first class rooms with sidelights and cot beds. There will be a maids' and valets' dining saloon arranged at the after end of the first class accommodation on the bridge deck.

The second class public rooms include dining saloon, smoke room and library, and the second class staterooms are arranged on the saloon, upper and middle decks.

General Smoke Room

The third class passengers have a general room and smoke room on the saloon deck aft, also a smoke room on the same deck forward. The third class mess rooms are large, comfortable apartments on the middle deck. The third class sleeping accommodation includes a large number of permanent and portable rooms.

The captain's and officers' accommodation is in a deckhouse at the fore end of the boatdeck; the engineers' on the port side of the upper deck, convenient to the engine room. The chief steward's office will be at the main entrance on bridge deck, port side, and the purser's office on the starboard side. The pantry and galley arrangements have been carefully devised to ensure the best possible service. The vessel is provided with refrigerating machinery and refrigerated storerooms. The emergency lighting set, consisting of Diesel engine and dynamo, is arranged in a steel house at the after end of the saloon deck, with storage tanks on bridge deck overhead. Boats are provided sufficient for all on board.

It will thus be seen that the Statendam will be complete in every respect and represent the highest attainments in naval architecture. In marine engineering also she will embody the most recent advance, being, as already indicated, a triple screw steamer having a combination of the most highly perfected reciprocating engines with a low-pressure turbine.

The following description of the decorations of the principal first class public rooms and staterooms will convey some idea of the sumptuous character of the appointments of the Statendam:

One of the most interesting apartments in the ship is the restaurant, which has seats for 560 passengers at small tables arranged in the favorite restaurant style with arm chairs of the most comfortable design.

The whole room is carried out in Louis XVI style; old white decorated with gold. The walls are divided up by pillars and richly carved panels with bas-reliefs and electric lustres, and decorated here and there with sectional tile-pictures made in Delft. These, with their rich colors and fine finish, have a very pleasing artistic effect.

On both port and starboard sides there are a number of large windows of special construction, ensuring perfect light and ventilation. These windows are decorated with painted glass of unique design.

The tables have small lamps with floral decoration. The floor is covered with a luxurious French red carpet, whilst the numerous ceiling lamps of carefully chosen pattern give a very dignified and festive appearance to the whole.

Reception Room

This room, measuring about 83 feet by 47 feet and fully 9 feet high, is decorated with gray panelling and framing with old carving. The panels are covered with red silk relieved on right and left with treble window frames in pairs richly decorated with old gold and stained glass set in brass. The ceiling is panelled and painted in light color. The extensive sideboards and dressers at the after end are of dark mahogany with brass gilded mountings.

The furniture consists of square and round mahogany tables with chairs and sofas of varied patterns. The room is tasetfully provided with ceiling lights and wallbrackets, and the floor covered with a rich red carpet.

This is very spacious being 54 feet by 31 feet and 11 feet 6 inches high decorated in cream lacquered framing with Italian marble panels, some of

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them with large tiles representing old Dutch landscapes, while the hall is surmounted by a large dome ornamented with stained glass.

A magnificent marble staircase with wrought iron balustrade and brass railing leads from five decks to the reception room, while two passages with entrances and flower shops on each side lead to the lounge and the promenade deck.

The hall is effectively furnished with groups of wicker tables, chairs and sofas; the floor covered with rubber tiles, and the lighting is by means of ceiling lamps and wallbrackets to match.

The library is about 54 feet by 34 feet and 11 feet 6 inches high decorated in Italian walnut, panels inlaid with Tuya wood. Right and left are large brass bay windows; forward two brass windows with marble chimney piece with fire grate in the centre; aft on each side are glass partitions with double doors, leading to first class entrance and in the centre a large bookcase. The ceiling is panelled and painted in light color. The furniture comprises writing tables, easy chairs and sofas, and the floor is covered with carpet in moss green. The lighting is done by ceiling lights and double wallbrackets to suit the decoration.

The lounge is a wonderful room 74 feet by 53 feet and nearly 19 feet high. Decorated in oak framing with richly carved oak panels; relieved by eight large brass framed windows, with embroidered red curtains in velours soie and with large gobelins between the centre windows, with representations of old Rotterdam. Four double entrance doors with Dessus de Forte give access to the passages, while the centre of the room is decorated on one with a magnificent marble chimney piece and on the other with a stage for the orchestra both flanked on each side with columns. The ceiling is decorated with richly carved panels painted in light color, while the large dome in the centre is decorated with hollow shaped carved panelling and stained glass. The furniture consists of sofas, chairs and tables of various styles, while the floor is covered with a handsome red carpet. The lighting is done by means of crystal tubes from the ceiling and from the double wallbrackets, specially designed to suit the scheme of decoration.

Vestibule or Verandah on the Boat Deck

This is another spacious rendezvous with a staircase, constructed in mahogany and executed in English style, connecting the lounge and smoke room. An open fireplace built into the wall opposite the staircase, and surrounded by easy club chairs, provides a cosy corner.

On the half landing of the stairs hangs a picture giving a view of Old Rotterdam. The whole is crowned by a splendid dome in stained leaded glass.

The smoke room is decorated in a late seventeenth century Dutch style, in oak with palisender and ebony. Ebony columns with panels divide the walls into sections, between which very beautiful gobelins are fitted. Amongst the decorative furniture there are a couple of seventeenth century chests with ebony columns. Four large bay windows with old Dutch leaded glass, and divided into medallions representing coats of arms and landscapes, give a dignified appearance to the apartment.

An open fireplace is also provided in this room, around which the passengers find the utmost comfort in luxurious easy chairs. Arm chairs and sofas with a number of card and other tables are spread about the room. The illumination is effected by means of Old Dutch classic chandeliers and lanterns hanging from the beams and rafters in the ceiling and giving a brilliant effect. A commodious bar separates the smoke room from the verandah cafe. The latter is executed in the style of Louis XVI, painted in dull gray enamel; the walls being divided up by brass framed windows and sliding doors; between the windows and doors panels with gratings are fitted, providing a holdfast for the plants and flowers in the flower boxes beneath them.

The furniture consists of elegant wicker chairs and tables, providing comfortable accommodation for the passengers, whose enjoyment is enhanced by the pleasant view from this spot. Tiles are fixed in the walls, the ceiling being decorated with flowers and birds, giving a charming appearance to the whole.

In addition to the other first class staterooms, there are, as already mentioned 32 special suite staterooms, comprising 16 bedrooms and 16 sitting-rooms with adjoining bath and wardrobe rooms. The bedrooms are in white enamel and gold, panels in silk, carpets to match. The rooms contain dressing and writing tables and two rich bedsteads and easy chairs. The sitting rooms are in various kinds of hard wood with silk and inlaid panels and carpets to match and have wardrobe, sideboard, writing table, table and easy chairs and Pullman sofa with portable Pullman sofa bed on top. The rooms are lighted by ceiling lights and wallbrackets with portable lamp on writing table.

The vessel and machinery have been constructed under the supervision of Mr. H. Van Helden, the chief superintendent of the line, assisted by Mr. J. Edixhoven, the owners' resident inspector at Belfast during construction.

The owners' party at the launch included Mr. and Mrs. Rypperda Wierdsma, Mr. and Mrs. Gips, Mrs. Wierdsma Mees, Mr. H. Van Helden, and Mr. J. Edixhoven, also a number of representatives of the Continental Press. Mr. Henry Tighe Rea, Belfast, Consul to the Netherlands, was also present at the launch.

As the vessel left the ways she was gracefully christened by Mrs. Rypperda Wierdsma.

L. C. Waldo in Dry Dock

The steamer L. C. Waldo which ran on the rocks in Lake Superior during the great storm last November is now in dry docks at Lorain. As a final episode in her varied career she fell to the bottom of the dry dock while she was being docked. This is a very rare occurrence. It is not exactly known how it happened. The water was just covering the blocks as she started to settle. As she settled she started forward knocking down the forward blocks but the after blocks are crushed under her. She had aboard of her at the time about 1,000 tons of wet ore and her tanks were filled with water. In her present shape she is a sight for the gods. Her after deck house is entirely gone and her iron plating beneath the deck house is as thin as tissue paper in places, having been eaten away by rust through moisture penetrating her wooden flooring, proving conclusively the necessity of covering the iron plating in deck houses with Byerlyte or some other moisture-resisting composition. She is broken amidships and her deck plating is so buckled and warped as to resemble waves. Her water bottom underneath the machinery spaces is shoved up four feet and the space is filled with broken rock which penetrated the hull as she was pounded by the seas. The tank top is considerably bulged at this point. She will be put in shape for an examination and offered for sale by the underwriters, who have settled for her as a constructive total loss.

The Luckenbach Steamship Co. began a thorough Panama canal service west-bound with the sailing of the steamer Isabella on Aug. 7.

No bids were received by the underwriters for the wrecked steamer Waldo.

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September, 1914

A Nation Without Ships

Well, the expected has happened. We are a nation without ships and are now put to every form of subterfuge to get them. For twenty years THE MARINE REVIEW has consistently directed attention to this very subject. It has pointed out time and again the folly of a nation with our enormous coast line and great manufacturing and agricultural productivity to be entirely dependent upon the ships of other nations to carry our products abroad. We have repeatedly said that if a European conflict should break out our ports would be as effectually blockaded as though squadrons of battleships were hovering outside of them. The European conflict has occurred and our ports are blockaded. What of the prophesies of those who have declared that a fight of nations would never again occur? One man has plunged all Europe into war and has demoralized the commerce of the world.

The United States today is an island far more insular than England ever was. It cannot get anywhere. Its commerce has begun to backwater and our legislators are now frantically striving to remedy a situation which their own short-sightedness has brought about.

We must be candid with ourselves and look this issue square in the face and put the blame where it belongs. It belongs with the middle states. It belongs with the great grain producing states who are now the greatest sufferers. It has hitherto been impossible to convince the farmer of Kansas that ships are as necessary to his well-being as they are to the coast states. Blind as a bat, he could not be made to see that the steamship owner was not the only person interested in the steamship. He felt that any extension of governmental aid to shipping interests went into the pockets of the ship-owners. He could not see that its purpose was to widen our markets and to keep the roadstead oversea open at all times to our commerce.

None of the warring nations of Europe would molest any of our merchant fleet engaged in the peaceful pursuit of trade, and we would now be reaping a rich harvest supplying those markets which Europe cannot now care for, had we the ships to do it. But we have none; we can neither seize the opportunity nor can we care for our ordinary trade, because it has always been carried on in foreign bottoms. Ninety-two per cent of our commerce has constantly gone abroad in foreign ships. Eight per cent of it we carried ourselves, and that is about the proportion that we can still carry. The other 92 per cent is backing water.

The bill granting American register to foreign ships provided they are purchased by Americans is a poor substitute. Foreign ships already owned by American corporations, such as the Steel Corporation, Standard Oil Co., and United Fruit Co., will probably be transferred to American register, but they must be officered by Americans holding government licenses or else our statutes in that respect will have to be amended. In any event, it is a poor way out of a dilemma which could easily have been avoided by looking broadly at the situation some years ago and extending our policy of protection to cover American shipping on the high seas.

The Hardy Bill

On July 6 the House of Representatives passed the Hardy bill, the title of which is "To Better Regulate the Serving of Licensed Officers in the Merchant Marine of the United States and to Promote Safety at Sea". It amends sections 4448 and 4449 of the revised statutes to read as follows:

"Section 4448: That all officers licensed under the provisions of this title shall assist the inspectors in their examination of any vessels to which such licensed officers belong and shall point out all defects and imperfections known to them in the hull, equipments, boilers or machinery of such vessel, and shall also make known to the inspectors at the earliest opportunity all accidents or occurrences producing serious injury to the vessel, her equipments, boilers or machinery, and in default thereof the license of any such officer so neglecting or refusing shall be suspended or revoked.

"No inspector or supervising inspector receiving information from a licensed officer who is employed on any vessel as to defects in such vessel or equipments, boilers, or machinery, or that any provision of this title is being violated, shall impart the name of such licensed officer or the source of his informa-

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tion to any person other than his superiors in the steamboat inspection service. Any inspector or supervising inspector violating this provision shall be subject to dismissal from the service.

"Section 4449: That if any licensed officer shall, to the hindrance of commerce, wrongfully or unreasonably refuse to perform his official duties after having signed articles, or while employed on any vessel as authorized by the terms of his certificate of license, or if any pilot or engineer shall refuse to admit into the pilot house or engine room any person whom the master or owner of the vessel may desire to place there for the purpose of learning the profession, his license shall be revoked or suspended upon the same proceedings as are provided in other cases of revocation or suspension of such license."

This measure upon casual survey would seem to be entirely innocuous, but upon analysis it proves to be a most pernicious piece of attempted legislation.

Section 4448 appears to have been put in merely for the purpose of raising a little dust and concealing the nigger in the wood pile.

The licensed officers are expected to assist the inspectors of hulls and machinery in their examination of steam vessels and there is no owner that is not eager to have them do so. The Hardy bill simply re-enacts that, but adds the provision that any local inspector or supervising inspector who shall divulge the name of the licensed officer furnishing such information to other than a superior officer shall be subject to dismissal from the service.

There is no particular occasion for the enactment of such a provision nor is there any special objection to its enactment except that it introduces the element of star chamber proceedings. Owners as a body are desirous of keeping their vessels in ship-shape fashion and undoubtedly both captains and chief engineers would welcome any suggestion to this end from the officers beneath them. The amendment is really without meaning except that it might offer a disgruntled mate or second engineer opportunity for making trouble for the captain or chief engineer; but it effects no self-respecting man.

The fuss that is raised in Section 4448 is designed really to permit the amendment to section 4449 to escape scrutiny. The present Section 4449 provides as follows:

"If any licensed officer shall, to the hindrance of commerce, wrongfully or unreasonably refuse to serve in his official capacity on any vessel as authorized by the terms of his certificate of license, or shall fail to deliver to the applicant for such service at the time of such refusal, if the same should be demanded, a statement in writing assigning good and sufficient reasons therefor, or if any pilot or engineer shall refuse to admit into the pilot house or engine room any person who the master or owner of the vessel may desire to place there for the purpose of learning the profession, his license shall be revoked or suspended upon the same proceedings as are provided in other cases of revocation or suspension of such licenses."

It will be noted that this section is amended to read as follows:

"If any licensed officer to the hindrance of commerce wrongfully or unreasonably refuse to perform his official duties *after having signed articles,* or while employed on any vessel as authorized by the terms of his certificate of license, etc." The Italics are ours.

Now what can be the purpose of this amendment? It actually takes away government control of the licensed officer by the steamboat inspection service until the officer has entered private employment or, in other words, signed articles. This bill was introduced by Mr. Hardy, of Texas, at the request of Capt. Wm. A. Wescott, of San Francisco, representing the masters, mates and pilots of the Pacific and the Neptune Association of New York. In this connection the following transcript from the hearing on the bill is quite illuminating:

Mr. Hardy: Let me see if I can state it so that the lay mind can understand it more readily than through your statements; the difference in that regard is that under the present law any licensed officer can be conscripted on any vessel on demand or else forfeit his license; that is the present law, is it not?

Capt. Wescott: Yes, that is the whole thing in a nut shell.

Mr. Hardy: And this bill proposed to permit the officers the liberty of refusing employment on any vessel without assigning a reason if he sees proper to do so.

Capt. Wescott: Absolutely so; the same as any other free man.

Mr. Hardy: But after he has signed articles and becomes an employe, the law, as it stands, would now apply to him.

Capt. Wescott: Yes; then we assume the responsibility.

Mr. Hardy: This bill in that respect simply stops the conscription of a man merely because he has a license.

Capt. Wescott: That is the only purpose of the bill.

Certainly a very novel use of the word conscription has been made in this connection. The present Section 4449 has been on the statutes since 1866 and during all that time there has not been a single case of conscription. The law is not so intended and in point of fact it is impossible under the law as it now stands. The present law safeguards the rights of licensed officers in every way. A certain duty is required of them by virtue of their commission from the government as licensed officers and this license may be suspended or revoked if they fail to perform this duty to the hindrance of trade upon request, but this suspension or revocation is not imposed until the officer has had a fair trial with the right to appeal from the local board to the supervising inspector of

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his district and even to the supervising inspector general. No necessity exists for changing in any manner whatever Section 4449. The section as it stands protects both the licensed officer and the public. The section as amended would enable the licensed officers to combine and dictate terms to steamship owners and it would only be necessary for a few of them to combine to tie up commerce, for a ship is forbidden to navigate without a full quota of licensed officers aboard. The section as amended would prove, in fact, a very effective hindrance to commerce. Moreover, it takes the control of the licensed officer out of the jurisdiction of the steamboat inspection service so long as he has not signed papers and is not in active employment. Under the amendment the owner is to continue to be bound to operate his property only by a licensed class, but that class is to be left free to, if they desire, not to exercise any authority at all, or if at all, on such terms as a few of the class may say.

For instance, it would be entirely possible for a comparatively few second mates upon the opening of navigation to decline to sign papers unless the captain or first mate or chief engineer was discharged or their wages advanced, or for any other reason. With their licenses temporarily out of their possession, they could not be compelled to sign nor could the ship proceed without them. There are six licensed officers aboard each ship and it would be entirely possible under this bill for a certain quota of subordinate officers to combine to tie up shipping altogether by simply refusing to sign articles until their terms were granted. This bill makes them amenable to the law only after they have signed articles. This bill removes them from the jurisdiction of the steamboat inspection service until they have actually shipped. This bill should be watched in the senate, as it is a most pernicious measure.

It should be kept in mind that there is nothing in the law as it is, preventing licensed officers from organizing for any lawful purpose. They are, however, prohibited from combining for unreasonable or unlawful reasons when that results "to the hindrance of commerce".

The policy which declared that it was for the good of commerce and the people that steam vessels should only be employed in commerce at the hands of officers licensed by the Inspection Service, also dictated that the men so licensed should not be empowered to hinder commerce unlawfully by reason of that license and the restrictions imposed on the employment of steam vessels.

This bill would be a complete reversal of policy; would correct no evil, but promote it.

What a golden opportunity is now ours if we only had a resourceful merchant marine. The stars and stripes might now be flying in every neutral port with the products of our fields and factories. But—where are the ships?

Navigation in Fog

Representative Alexander, chairman of the committee on merchant marine and fisheries, has introduced in the House of Representatives an act to amend Rule 15 of the Pilot Rules of the Great Lakes to read as follows:

"In a fog, mist, falling snow or heavy rainstorm, no vessel shall proceed at greater speed than will permit her being stopped within the range of visibility ahead of the ship having careful regard of the existing circumstances and conditions.

"A steam vessel hearing, apparently forward of her beam, the fog signal of a vessel, the position of which is not ascertained, shall, so far as the circumstances of the case admit, stop her engines and then navigate with caution until danger of collision is over.

"Every pilot, mate or master of any steam vessel, or person or persons acting in such capacity, who violates the provisions of this rule shall be deemed guilty of a misdemeanor and on conviction thereof shall be punished by imprisonment for not less than six months nor more than two years in the discretion of the court. Any violation of this rule shall be prosecuted in the district wherein the offender is found or into which he is first brought."

It is understood that this measure has been introduced in Congress by Representative Alexander by request, the request coming from the Secretary of Commerce. It will be seen that the purpose of the measure is to incorporate in the pilot rules the suggestion of Captain Commandant Bertholf of the United States Revenue Cutter Service that moderate speed in fog shall be defined as that speed in which a vessel may stop herself within the range of visibility ahead of the ship. Considering the source from which it comes, the suggestion is a highly surprising one. A moment's reflection will convince anyone that the range of visibility ahead could not be determined without a fixed bearing. No one could tell unless he had a fixed object to bear upon how far he could see into such an elusive thing as fog. Moreover, as the ship is a moving object, the range of visibility is constantly changing.

The pilot rules as they stand today are as perfect as the wisdom of navigators can make them. They will undoubtedly prevent collision in fog if they are rigidly enforced. What is wanted in this particular is not new legislation, but a vigorous enforcement of the present rules. The present rules provide for a fine for violation as follows:

"A fine, not exceeding $200, may be imposed for the violation of any of the provisions of this act. The vessel shall be liable for the said penalty and may be seized and proceeded against, by way of libel, in the District Court of the United States for any district within which such vessel may be found."

The captain of the ship is solely responsible for the navigation of the vessel and it is upon him that the fine would fall, though the government makes the ship liable in order to insure the collection of the

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fine. There is no doubt whatever that if this provision were enforced for proved violation, there would be no such thing as running at full speed in fog on the Great Lakes. The master's income is not such that he can stand many assessments of $200 each in a season.

Whatever may have been the state of things in the past, there is no question whatever that the owners desire that the pilot rules shall be strictly observed and that their vessels shall proceed under check during fog. If any master navigates a ship otherwise, he is doing it wholly on his own responsibility, and if he is proved to be guilty he deserves to be punished.

Rule 15 as it stands on the statutes today reads as follows:

"Every steam vessel shall, in thick weather, by reason of fog, mist, falling snow, heavy rainstorms or other causes, go at moderate speed. A steam vessel, hearing, apparently not more than four points from right ahead, the fog signal of another vessel, shall at once reduce her speed to bare steerageway and navigate with caution until the vessels shall have passed each other."

It would be an extremely unwise proceeding to change or modify in any particular this rule, because it is a wise and workable rule, whereas, as has been shown, the Alexander amendment is an unworkable one. Justice Brown, in rendering decision in the Umbria case in 1896, said:

"The general consensus of opinion in this country is to the effect that a steamer is bound to use only such precautions as will enable her to stop in time to avoid a collision, after the approaching vessel comes in sight, provided such approaching vessel is herself going at the moderate speed required by law. In a dense fog this might require both vessels to come to a standstill until the course of each was definitely ascertained. In a lighter fog it might authorize them to keep their engines in sufficient motion to preserve their steerageway."

Note how closely his opinion follows the language of Rule 15. We repeat that if Rule 15 is strictly observed, such a thing as a collision in fog would be practically unknown. The wise thing, therefore, to do is to enforce the present rules. In fact, the penalties imposed for violation of the present rules are very severe, because in addition to a fine, if any loss of life occurs, the person responsible for the accident is guilty of manslaughter and the Circuit Court has held that to establish that fact intent does not have to be shown. This provision reads as follows:

"Every captain, engineer, pilot or other person employed on any steamboat or vessel by whose misconduct, negligence or inattention to his duties on such vessel the life of any person is destroyed, and every owner, charterer, inspector, or other public officer through whose fraud, neglect, connivance, misconduct or violation of the law the life of any person is destroyed, shall be fined not more than $10,000 and imprisoned not more than ten years or both. Provided, that when the owner or charterer of any steamboat or vessel shall be a corporation, any executive officer of such corporation, for the time being actually charged with the control and management of the operation, equipment or navigation of such steamboat or vessel, who has knowingly and willfully caused or allowed such fraud, neglect, connivance, misconduct, or violation of law, by which the life of any person is destroyed, shall be fined not more than $10,000 or imprisoned not more than ten years or both."

Lake Trade

Life, they say, is just one damn thing after another, and the phrase very aptly describes lake trade during the present season. The business has had its ups and downs in past years, but it has never before received such a variegated assortment of rebuffs. The line which Milton inscribed over the gates of hell, "Abandon hope all ye who enter here", about expresses the mental point of the vessel owner. He is just about ready to abandon hope. The season started out lamely enough, but hope burned brightly. Everybody believed that things would get brighter in about a month and when the month went by and they did not get any better, vessel owners did not lose hope, but merely postponed their expectations for another month, arguing that the furnacemen could not stay out of the market forever. When the months went by and the furnace interests continued to stay out, they pinned their faith in grain. The crop was heavy and would have to move briskly in August. Rates were low, of course, but they would mend as time went on. But now comes a staggering conflict of armed forces abroad and the export trade goes glimmering. Vessel charters are cancelled; grain is loaded into vessels and then unloaded at the loading port; other vessels leave and are recalled, and still others that deliver their cargoes cannot get their freight money. Meanwhile the elevators fill up and there is stagnation and delay all around. Time is being eaten up and the ships are not earning anything, and altogether a state of demoralization prevails, of which no one can see the end. Vessels are going to dock by scores, because there is nothing for them to do. The year 1914 will be long remembered on the lakes as the worst on record.

What a great pity it is that we haven't our own ships to do the world's business in. Here is South America, clamoring for our products, and we simply have not the ships to carry them there. Here is the Panama canal opening during the present month and no one displays the slightest interest in it, because we have scarcely any ships to go through it. The European conflict has literally thrown the world's markets open to us and we cannot take advantage of it.

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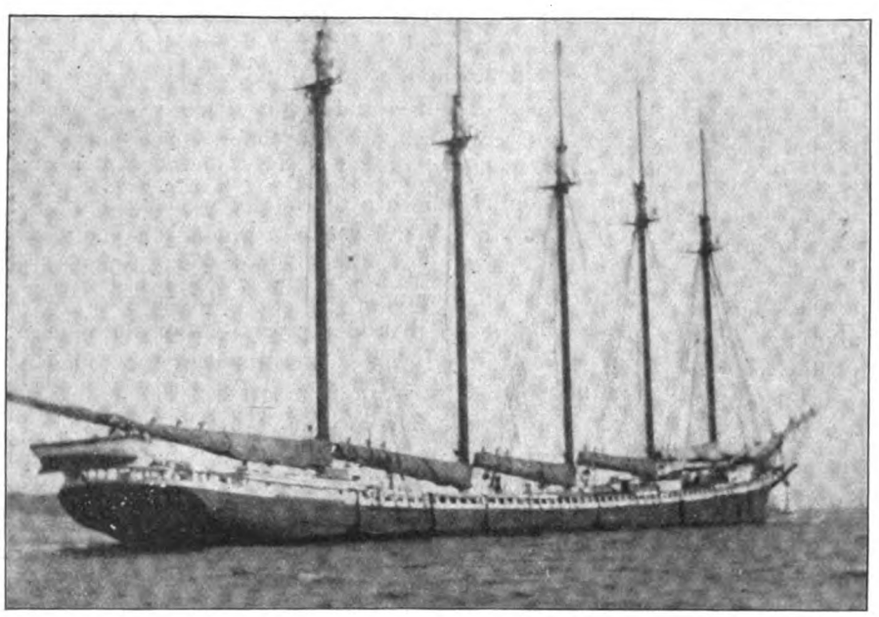
The Last of the Hudson

When Atlantic coast seafaring men heard that the five-mast schooner George P. Hudson had been rammed and sunk in Vineyard Sound in a fog on July 12, they said: "Oh, they'll raise her again; you can't kill the Hudson!"

Such was this old schooner's reputation for toughness, but it is very unlikely that she will recover from this latest disaster. The steam collier Middlesex cut a 50-foot hole in her port bow when she hit her, her fore and main masts were carried away by the crash, and she went down almost instantly in 13 fathoms, taking with her Capt. John H. Thomas, of Cambridge, Mass., and two negro seamen who had no time to get away.

Incidentally her loss reduces the number of five-mast schooners on the east coast to 23, while there are now but seven six-masters remaining. The unwieldly type has been hard hit by steamers and barges of late; none have been built in the last five years, and the rig is slated for early extinction.



FIVE-MASTED SCHOONER GEORGE P. HUDSON

The Hudson perhaps was the best known of the the big wooden sailing craft on the coast except the pioneer five-master Governor Ames, and it is to the remarkable series of mishaps she suffered during her 14 years' career that she owed her fame.

She was built at Waldoboro, Me., in 1900, was 2,075 net tons, 266 feet long and had a carrying capacity of 3,500 tons of coal. Originally she was called the Fannie Palmer, and a member of the famous white-painted fleet, now disbanded, of William F. Palmer, of Boston. Her first notable mishap occurred in January, 1906, when she missed the entrance of Chesapeake Bay in thick weather while inward bound in ballast, and went high and dry on Virginia Beach.

The stumps of an ancient submerged forest penetrated her bottom, and her case looked so hopeless that she was abandoned to the underwriters. Finally floated by a wrecking company she was repaired by them and renamed for the man responsible for her salvage. Later she was sold to the Coastwise Transportation Co., of Boston, and again when that concern began to replace its schooners with steamers, to Russell Brothers, of Boston.

Several years ago she stranded in a gale of wind on the south side of Long Island, a sinister graveyard of ships which lets few escape once they strike the sands. The Hudson bilged and filled with water, but was floated and made as good as new. Later while bound from Portsmouth to a coal part she went ashore in the fog on Peaked Hill Bar, one of the worst menaces to navigation off dreaded Cape Cod. Fortunately she was in ballast; again she surprised the seafaring fraternity and was pulled off intact.

Twice she had been on fire in Hampton Roads when loaded with coal. On each occasion the blaze is supposed to have started from the donkey engine in the forward house. Both times it was extinguished before reaching her cargo, though serious damage was done above decks and the vessel was nearly sunk by the weight of water pumped into her to put out the flames.

While at anchor in New York bay a few years ago she was run into by a tramp steamer which struck her abreast the spanker-mast and almost cut her stern off. Once more she survived what would have proved a death blow to many of her sister craft, and not long after was in commission again.

When last October she ran into the five-master Margaret Haskell in the fog in Vineyard Sound, she seems to have been the aggressor for the first time on record. On that occasion, however, she by no means escaped unscathed, for she lost part of her headgear and damaged her stem, being towed to Boston and repaired. Her many misadventures had robbed the Hudson of nearly every vestige of her once graceful sheer, and marine observers along the coast recognized her as being the worst "hogged" craft in the coal trade.

A coincidence connected with her passing was that the Middlesex, which finally sank the Hudson, is owned by the Coastwise Transportation Co., which had discarded the big schooner a few years before.

Panama-Pacific Service

The International Mercantile Marine Co., comprising the American, Atlantic Transport, Red Star, White Star and White Star-Dominion Lines announce that early in 1915 a new passenger and freight service to be known as the Panama Pacific Line will be established, sailing every three weeks between New York and San Francisco through the newly opened Panama canal. The steamers selected for this new route from coast to coast are the Finland and Kroonland, each 22,000 tons displacement, favorably known to thousands of trans-Atlantic travelers who have voyaged upon them in the Red Star Line's New York-Dover-Antwerp Service. The Finland and Kroonland are American-built steamers flying the American flag, and as they are the largest vessels ever scheduled in a regular coast to coast trade, they will meet the popular demand for a pleasant, comfortable coastwise voyage with a trip through the Panama Canal to see the wonders of its operation.

The transit from New York to San Francisco will be made in sixteen days, and the Finland and Kroonland will call enroute either to San Diego or at Los Angeles, according to itinerary, which will be a great convenience for travelers bound to and from the southern section of California. In view of the expected large volume of travel to

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the Panama Pacific International Exposition at San Francisco next year, the new and interesting route through the Panama canal will undoubtedly prove most attractive to many tourists, especially those who desire to avoid railroad travel across the continent.

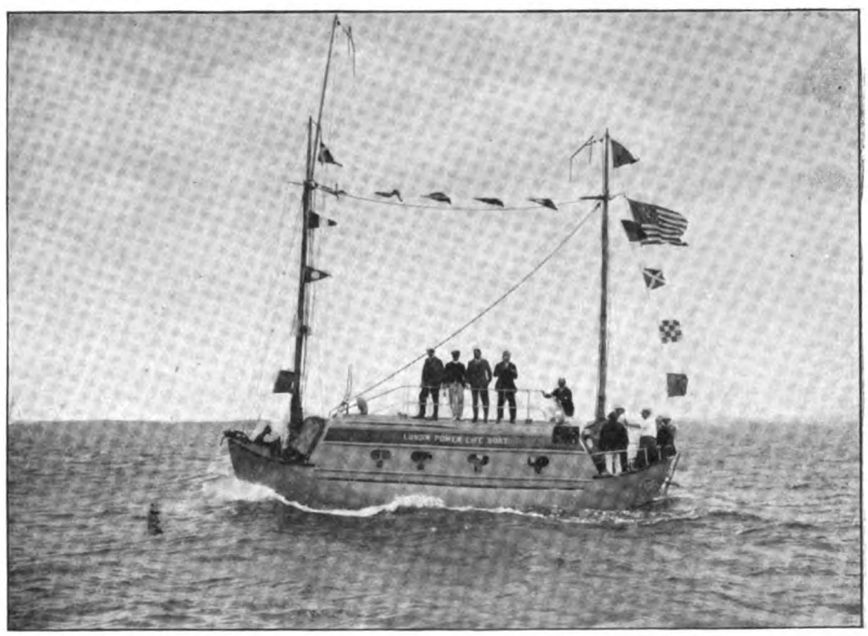
Power Life Boat Lundin

The power life boat Lundin left the Battery, New York, on July 28, to sail across the Atlantic ocean, but was recalled while enroute to Halifax, owing to the European war. About 15 attempts have been made to cross the Atlantic in small boats and practically all of them succeeded though none of them were as well equipped for the task as is this Lundin boat. There is no good reason why the Lundin boat should not go anywhere with perfect safety. This power boat is built entirely of galvanized sheet steel and is 36 feet long, 12 feet wide and draws 27 inches. The boat is flat bottom and flat sided, though a fender of balsa wood one foot thick on each side of the boat gives her a rounded look.

The hull is constructed of No. 12 Birmingham wire gage galvanized steel plates with all seams double riveted with red lead and flannel laid between. The deck house is of No. 18 Birmingham wire gage steel with athwartship ribs inside and fore and aft ribs outside that greatly stiffen the structure. The hull is practically an oblong steel box 36 feet by 10 feet by 4 feet deep, flat on the bottom with a steel floor or deck 34 inches above the bottom. This 34-inch space forms a double bottom which is sub-divided by cross bulkheads and fore and aft partitions into ten separate airtight compartments. Access into each of these spaces is possible by circular removable covers clamped down on hatches in the steel deck. Automatic scuppers drain any water that may get in through pipes leading down through the bottom. The depth from gunwale to bottom is 4 feet. The total depth from roof to keel is 7 to 8 feet and the head room is 5 feet 10 inches. At gunwale height there are seven cross seats or thwarts and fore and aft seats along each side and along the engine box, seating 85 persons. The interior is lighted through eight specially designed ports, four on a side, which may be opened to admit air or may be clamped down watertight.

Just aft of amidships in a metal box compartment a four-cylinder, 6 x 18, 36-horsepower Standard motor is installed equipped with an electric self-starter and belted to a dynamo which furnishes electric light and power for the wireless outfit. The propeller, 27-inch diameter by 39-inch pitch, turns in a tunnel built in the house bottom aft. Both bow and stern are full with a metal rudder hung outboard of the stern fitted with a tiller, and for the trip across a quadrant and steering gear. Two 230-gallon seamless steel tanks for gasoline are supported on leather-lined steel saddles, strapped fast in the bilge compartments either side of the motor box. A pump on the motor raises this fuel to a small feed tank to the forward port corner of the motor box where it feeds by gravity to the vaporizer. For the trip across extra boxed cans of gasoline will be stowed in the various air-tight compartments in the boat's double bottom. Fresh water is carried in two cylindrical tanks, 100-gallons capacity each, swung level with the floor just aft of the engine compartment. Ventilation is provided by air vents that automatically close if turned upside down, two forward and two aft, fitted in the roof after main cabin. A cowl on roof feeds air down into the wireless compartment. A blower belted to pulley on shaft at after end of engine box draws air out and up through a vent over after end of engine box.

Two masts 30 feet long are hinged to fold down on cabin top when the boat rests on a steamer's deck. Their butts are stepped into iron sockets built in the hull just outside the house. A double set of shrouds and head stays steady each mast, being set taut with galvanized iron turnbuckles, shackled to chain plates riveted to the plating. A large staysail to hoist to main mast head and a small jib are fitted to help her in a fair breeze. A complete Dayton electric light outfit will furnish electric lights throughout the boat as well as the running lights. Cooking will be done on an electric stove. The wireless equipment is sufficient to transmit messages 100 miles and to receive them from 600 to 1,000 miles. The outfit is the same as that used in the United States submarine boats.



POWER LIFE BOAT LUNDIN, WHICH STARTED ACROSS THE ATLANTIC OCEAN ON JULY 29

Finding Position in Fog

Some results of much interest to navigators are likely to be obtained from the tests which are to be conducted on the Canadian Northern liner Royal George, which sailed from Avonmouth recently for Quebec and Montreal.

She has been fitted with the Marconi-Bellini-Tosi apparatus, which will enable her in the thickest weather, and without the aid of the compass or sextant, to find her position when she is within a radius of fifty miles of a fixed wireless station, or one on board a ship whose position is known. Also, should she pick up the wireless distress signal on this apparatus, she will be able to set her course towards its source, even though the ship in distress has not been able to give her position.

This is the first time the equipment has been carried on an Atlantic liner, but it has been tested on a small steamer plying between Hull and Christiania.

The Navy Department has appropriated $40,000 for the Pensacola navy yard, the money to be used in improvements suggested by President C. E. Dobson, of the local Board of Trade.

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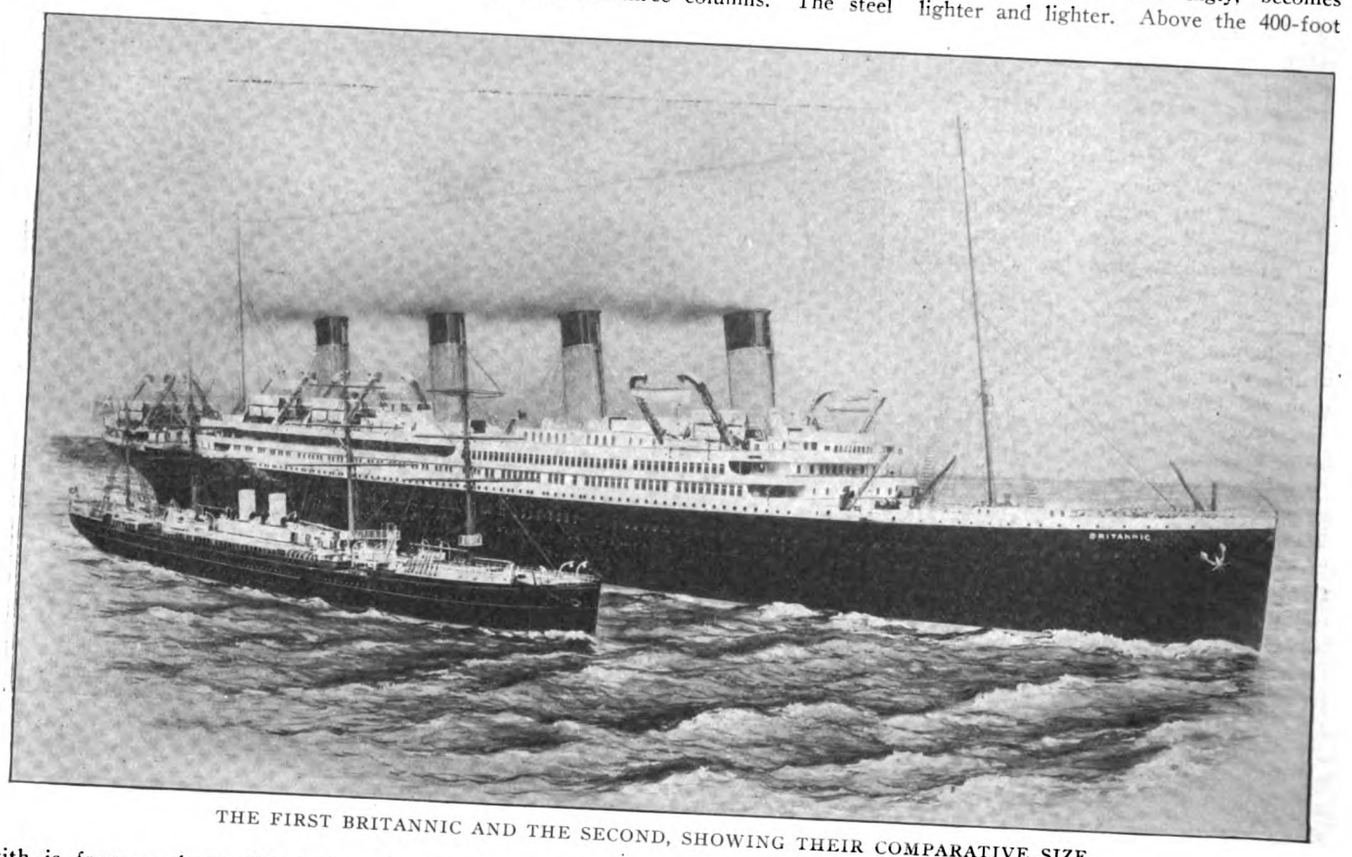
The Two Britannics

Nearly every regular traveler across the Atlantic becomes attached to some favorite steamer on which he voyages numerous times and which he constantly recommends to his friends. The White Star liner first to bear the name Britannic, launched in 1874 and employed regularly in trans-Atlantic crossings until 1899, was in the fullest sense of the term a favorite vessel and is remembered pleasantly by scores of thousands. The second steamer to bear this illustrious name is a giant ten times larger than her predecessor, and is now nearing completion at Belfast.

The birdseye view reproduced herewith is from a photo of actual models of these steamers and they demonstrate vividly the rapid strides made during the past four decades in the fine art of ship construction. The newer and greater Britannic, 50,000 tons, largest of all British steamers, will enter the White Star Line's New-York-Plymouth-Cherbourg-Southampton service next spring.



THE FIRST BRITANNIC AND THE SECOND, SHOWING THEIR COMPARATIVE SIZE

Darien Radio Station

The erection of steel in the first of the three 600-foot steel towers for the Darien radio station was begun on Thursday, July 9. The construction forces of the contractor for their erection have been engaged in preliminary work since the early part of June. They have assembled the principal parts of the plant, including a hoisting engine, cables, ropes, derricks, and timber for erection staging and falsework, have handled the first sections of steel to the site of tower No. 1, and have completed at this site a 150-foot timber tower from which to handle the steel to the 200-foot level.

This erection tower has been built in the center of the site of the steel tower, equidistant from the three footings, which are set in an equilateral triangle, 150 feet on the side. It has been surmounted by a stiff-legged derrick, with a 60-foot boom, which can revolve in a complete circle and be used, without further adjustment, for working over the three columns. The steel will be swung into place by derrick and be secured and supported by timber falsework. When it is completed to the 150-foot level it will be selfsupporting by reason of struts and cross-bracing. The three legs batter inward, so that at the 150-foot level they will form the points of an equilateral triangle, 75 feet on the side. The faces of the concrete footings have been inclined from the horizontal sufficiently to be perpendicular to the columns with this batter. The base girders and anchor bolts have been set in the concrete on a line with the batter of the columns.

The derrick set on the 150-foot timber tower will handle the steel to the 200-foot level. When the steel has been carried to the 200-foot level, the timber tower and derrick will be dismantled and transferred to the site of tower No. 2. The contractor has not decided the method of operation above the 200-foot level, but it will probably be an adaptation of the gin pole; a pile or other heavy timber with a sheave on the upper end will be rigged to the highest section of the steel column, and the next section will be hoisted into place, lashed, and bolted. At the 200-foot level the columns will be 15-inch I-beams, and the pole can be fitted into the groove along the back of the beam.

The plan of the tower becoming constantly smaller as it approaches the top, where it will be only 10 feet on the side. The steel, accordingly, becomes lighter and lighter. Above the 400-foot level the material will be so light, relatively, that the men will work from the inside, and the gin pole will be abandoned for a small derrick; toward the top the steel will be handled into place by hand line.

About 800 tons of steel have been delivered on the Isthmus. This is approximately that for the first 200 feet of towers Nos. 1 and 2; none of the steel for tower No. 3 has been delivered. The towers are identical, except that No. 3 has one short leg. A total of slightly over 960 tons of steel will be used.

The contractor for the fabrication and erection is the Penn Bridge Co. of Beaver Falls, Pa. This company sublet the fabrication of all the steelwork to

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the Toledo Bridge & Crane Co. of Toledo, Ohio, and the erection to the Central American Construction Co., Limited, of Colon. After the latter corporation was placed in the hands of a receiver, in March, 1914, the Penn Bridge Co. made a second contract for the erection with Mr. J. O. Childers of the Childers Construction Co., of Columbus, Ohio. Mr. Childers was once a superintendent for the Penn Co., and was field superintendent for the McClintic-Marshall Construction Co. in its work on the Canal, principally in the erection of the lock gates. He arrived on the Isthmus to take charge of the work at Darien about the middle of April. His present force consists of 12 white men and 13 West Indian negroes.

Forces of the supply department, numbering one gold and about 50 silver employes, are engaged in finishing the grading and filling about the concrete footings for the towers, and in the erection of a concrete operating building, one story in height and 26 by 50 feet in plan. They have completed a one-story concrete power house, quarters for the operators, and a cottage for the chief electrician. The navy department has a chief electrician on the grounds, supervising eight silver employes in handling miscellaneous materials and stores.

Orbita for Panama Canal Service

On Tuesday, July 7, the large, triple screw mail and passenger steamer Orbita, built to the order of The Pacific Steam Navigation Co., Liverpool, was launched at Belfast by Harland & Wolff Ltd.

The new vessel is 569 feet 3 inches in length over all, 67-foot beam, and will have a gross tonnage of about 15,500 tons, and has been designed specially for The Pacific Company's service to the east and west coast of South America, having, besides extensive passenger accommodation, very large capacity for cargo, the arrangements for which are of the most approved character.

The vessel is very strongly constructed with double bottom throughout, ten watertight bulkheads and seven steel decks. The Orbita will have accommodation for, in all, over 1,100 passengers—first second, intermediate and third class.

The first class dining saloon, on the main deck, extends the full breadth of the vessel. It is framed and panelled, and finished in white and gold. This saloon will seat 197 persons.

The first class smokeroom, situated on the promenade deck, is panelled in oak in the style of the Jacobean period. It has a raised roof over the centre, and is fitted with a handsome coal fireplace. Two handsome paintings also will adorn this apartment.

The first class verandah, also on the promenade deck, is finished in trellis work, and furnished with tables, chairs, etc.

The first class lounge, on the promenade deck, is framed and panelled in satinwood. The furniture is mahogany; the room being furnished with small tables, chairs, settees and writing tables, and a motor water fountain will be arranged in the middle of the room.

There is an admirably equipped gymnasium and a children's playroom; and an enquiry office, shop, barber's shop, armory room and dark room.

The Orbita will also be equipped with an up-to-date laundry.

The first class staterooms are arranged on the shade and awning decks, and are all fitted with comfortable bedsteads. Each room has open washbasin, wardrobe, etc., with an easy chair. A number of the staterooms are intercommunicating. On the awning deck, the sleeping rooms are arranged on the tandem principle, giving natural light and ventilation to all rooms. There are also rooms for passengers' servants, suitably furnished.

Separate rooms are allotted on the awning deck for the British doctor, Spanish doctor and surgeon.

The second class dining saloon is on the main deck and extends the full width of the ship. It will seat 207 persons. The room is framed and panelled, and finished in white, relieved with gold, the dado and furniture being of oak.

The second class smokeroom, at the after end of the promenade deck, is framed and panelled in oak, with choice dark green upholstery.

The second class verandah, on the shade deck, is finished in enamel white.

The second class lounge is also on the shade deck, framed and panelled in sycamore, with mahogany dado, the furniture being mahogany and the upholstery green moquette.

The second class staterooms generally are treated in a similar manner to the first class, with folding iron beds.

The intermediate accommodation consists of dining saloon, to seat 122 persons, general room and staterooms, suitably furnished and in good positions in the ship, and this class will be very comfortable.

The third class accommodation is also of a superior character, and all arranged to pass the requirements of the board of trade and Spanish law.

The refrigerating plant is of the horizontal duplex marine type, with surface condenser.

The steering gear is of Harland & Wolff's latest type. There are 12 cargo and warping winches and four electric boat winches, besides capstan and steam windlass.

The steamer will be equipped with a sufficient number of lifeboats to accommodate all persons on board.

Needless to say, the vessel has complete installation of electric light, and is also fitted with wireless telegraphy and submarine signalling, together with combined semaphore and Morse signalling appliances.

As already mentioned, the Orbita is a triple screw steamer, having a combination of reciprocating engines and low pressure turbines. She will have two steel pole masts, fore and aft, schooner rigged. The vessel and machinery are being built to the highest requirements of Lloyd's for 100 A1 class.

Another mail steamer, similar to the Orbita, is now being built for the company, and will be named the Orca.

A special feature of the Orbita will be the large number of single berth cabins for passengers, and in the first class the remainder of the sleeping rooms will have only two bedsteads in them, though a few of the cabins will be fitted with an upper berth for the accommodation of families.

In the second class no sleeping cabin will be fitted with more than three berths, many of the rooms having only one or two berths in them.

During construction the vessel has been under the survey of Capt. Drummond, the Pacific Co.'s marine superintendent, and Mr. H. Forbes, superintendent engineer. Capt. Drummond and Capt. Lawrenson, local inspector, represented the owners at the launch.

Submarine Intership Communication

Experiments recently made by the Submarine Signal Co., of Boston, with the Fessenden submarine telegraph oscillator seemed to indicate that through its use ships may warn each other of their approach in thick weather and determine their relative positions and communicate in the Morse code. In a recent test the Boston lightship was enabled to pick up messages from a collier approaching from Cape Cod at a distance of 13 miles. Prof. Fessenden has been working for some time on the problem of submarine intership communication. The device is about 20½ inches in diameter by 15 inches thick and weighs 850 pounds. It is composed of a heavy ring magnet built in two parts, the magnet being energized by an electric coil which pro-

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duces a very strong magnetic flux. Concentric with the magnet is a central core having a double winding through which an alternating current of 500 alternations per second is run. Lying in the gap between the core and the magnet is a copper tube about 8 inches in diameter and about 8 inches long. When the alternating current is turned on it induces a current in the copper tube and the copper tube being free to move jumps. When the current in the central core is reversed the copper tube is jumped back in the opposite direction. This copper tube is attached to a large diaphragm which is in direct contact with the water through which the sound waves are to pass. The oscillations of the copper tube give the diaphragm a vibrating motion of about one-hundredth of an inch amplitude at a frequency of 500 per second.

This apparatus is used not only for sending and receiving Morse code messages, but is the same apparatus used in getting echoes from icebergs, for taking soundings and for telephonic work as a transmitter and as a receiver.

The oscillator used as a receiving apparatus becomes a very sensitive magnetophone with which signals have been heard up to a distance of 20 miles. So sensitive is this apparatus that when it is mounted with its heavy diaphragm, which is 1 inch thick and 24 inches in diameter, if a person stands in front of the diaphragm and talks, his speech will be transmitted through wires to a telephone receiver. The sensitiveness of the apparatus can be understood when it is realized that under these conditions it is simply the energy of the sound waves of the voice deflecting the 1-inch thick diaphragm. The motion of this diaphragm causes the copper tube to be moved a very small fraction of an inch up and down through the magnetic field, thus acting as a generator and operating the diaphragm of the receiver.

Tests have been made with the oscillator used for submarine telephony. Up to the present time, however, these have only been tried with an ordinary telephone transmitter which will not carry a high current. Using six cells of dry battery speech has been clearly transmitted to a distance of half a mile, and from the results of our tests there is no doubt that speech can be transmitted a much greater distance if a transmitter is used which will carry a greater current.

The submarine bell located at Whitefish Point, Lake Superior, was recently picked up at a distance of 35 miles.

What is Contraband?

There is an international list of articles which, by general agreement among the treaty nations, can never be considered as contraband. Foremost among the articles important to the United States is cotton. Of almost equal importance is the fact that gold is a contraband of war, conditionally only. It becomes contraband absolutely if it is shipped to a nation involved in war, and is liable to seizure by ships of the enemy of that country.

Cotton was placed on the non-contraband list at the London Naval Conference, notwithstatnding that it had been treated by Russia as contraband during the Russo-Japanese war. While the London Declaration has not been ratified by all nations it is practically certain, according to international law authorities, that its shipment would not be interfered with by any European nations in case of a general war.

Absolute contraband of war, which is always liable to seizure, consists of all war material: Guns, ammunition, military vehicles of all sorts. Other articles, except those on the non-contraband list, may be treated as contraband by a belligerent after giving notice to the neutral nations of the articles it has classed as liable to seizure.

"Conditional contraband is not liable to capture except when found on board a vessel bound for territory belonging to or occupied by an enemy or for the armed forces of the enemy, and when it is not to be discharged at an intervening neutral port. The ship's papers are conclusive proof both as to the voyage in which the vessel is engaged and as to the port of discharge of the goods, unless she is found clearly out of the course indicated by her papers and unable to give adequate reasons to justify such deviation."

Article 24 of the convention is as follows:

The following articles, susceptible of use in war as well as for purposes of peace, may without notice be treated as contraband of war, under the name of conditional contraband.

1. Foodstuffs.
2. Forage and grain suitable for feeding animals.
3. Clothing, fabrics for clothing and boots and shoes suitable for use in war.
4. Gold and silver in coin or bullion; paper money.
5. Vehicles of all kinds available for use in war and their component parts.
6. Vessels, craft, and boats of all kinds; floating docks, parts of docks, and their component parts.
7. Railway material, both fixed and rolling stock and material for telegraphs, wireless telegraphs, and telephones.
8. Balloons and flying machines and their component parts, together with accessories and articles recognizable as intended for use in connection with balloons and flying machines.
9. Fuel; lubricants.
10. Powder and explosives not especially prepared for use in war.
11. Barbed wire and implements for fixing and cutting same.
12. Horseshoes and shoeing materials.
13. Harness and saddling.
14. Field glasses, telescopes, chronometers and all kinds of nautical instruments.

A neutral vessel is liable to capture when more than one-half of its cargo is contraband. The war vessel making the seizure may measure her contraband by value, volume, weight, or the freight rate, and if it can bring the contraband up to more than one-half of the cargo by any of the four methods it may make a prize of the ship.

The following are the articles which can never be classed as contraband, according to Article 28 of the London Declaration:

1. Raw cotton, wool, silk, jute, flax, hemp and other raw materials of the textile industries and yarns of the same.
2. Oil seeds and nuts; copra.
3. Rubber, resins, gums and lacs; hops.
4. Raw hides and horns; bones and ivory.
5. Natural and artificial manures, including nitrates and phosphates for agricultural purposes.
6. Metallic ores.
7. Earths, clays, lime, chalks, stone, including marble, bricks, slates and tiles.
8. Chinaware and glass.
9. Paper and paper-making materials.
10. Soap, paint and colors, including articles exclusively used in their preparation, and varnish.
11. Bleaching powder, soda, ashes, caustic soda, salt cake, ammonia, and sulphate of copper.
12. Precious and semi-precious stones, pearls, mother-of-pearl and coral.
13. Clocks and watches.
14. Fashions and fancy goods.
15. Feathers of all kinds, hairs and bristles.
16. Articles of household furniture and decoration; office furniture and requisites.

Of course all non-contraband articles may be seized by a belligerent if they are conveyed in a ship flying an enemy's flag, or if more than half of the remainder of the cargo is contraband.

One article enacted by the London Naval Conference which will operate to the advantage of the United States in case of a European war, according to authorities on international law, is the definition "c o n d i t i o n a l contraband."

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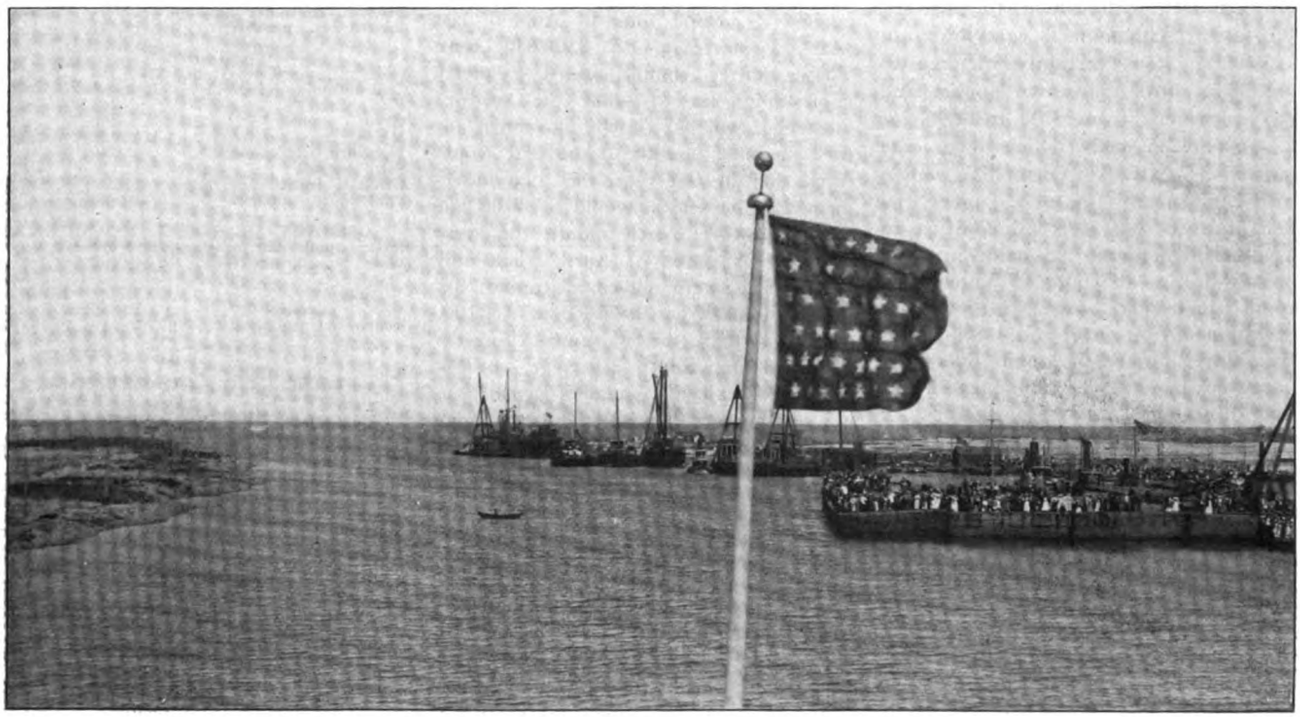
Under the declaration, foodstuffs and commodities, which are not war materials in themselves, can only be declared contraband when they are destined for the territory of a nation at war.

Cape Cod Canal

The Cape Cod canal was officially opened on July 29 with imposing ceremonies. The canal runs about northeast and southwest and connects Cape Cod bay with Buzzards' bay. A 2,400-foot stone breakwater at the Cape Cod bay entrance protects the canal from heavy northeast storms. The new waterway will shorten the distance 70 miles for coastwise vessels sailing into Boston and provide a safe route for coastwise trade which hitherto has had to round Cape Cod. The length of the waterway is 8 miles; its length from 30-foot water in one bay to the other is 13 miles. At the present time it permits a draught of only 15 feet but by Oct. 1 it will have a minimum draught of 25 feet at low water. Its minimum width at bottom is 100 feet and at passing points, of which there are four, it is 200 feet wide. Rates and tolls on the waterway range from $3 for passage of power boats and other small craft to $100 for commercial vessels of 999 gross tons. Merchant ships of over 1,000 gross tons will pay 10 cents per gross ton. It is figured that the tolls have been placed low enough to capture all traffic. The canal was built by private enterprise at a cost of $12,000,000. August Belmont is the president of the Cape Cod Construction Co., which built the canal.



CAPE COD CANAL FROM THE MASSACHUSETTS BAY END

Photo by Edwin Levick, New York.

The Fighting Tonnage of Nations

The most recent issue of *Nauticus*, the German annual which deals with naval affairs, gives some valuable and up-to-date comparisons of the strength of the various fleets of the powers. The figures are brought up to May 15 last. The comparative figures in terms of displacement are:

	Ready. Tons.	Building. Tons.
1 Great Britain.....	2,205,040	593,420
2 Germany	1,019,417	325,988
3 United States.....	909,780	228,860
4 France	731,190	346,190
5 Japan	558,560	182,150
6 Italy	402,140	202,540
7 Russia	327,960	429,170
8. Austria-Hungary	249,550	156,070

Included in this list are all the ships specifically for use in warfare—battleships, ironclads, cruisers, torpedo-boats, and submarines; but other types such as training ships and transports are not reckoned. It is stated also that in the German figures the displacement of the submarines is omitted, as it is not accurately known; but it is estimated at 14,000 tons, which does not alter the relative position of Germany in the list. "The result is," says the *Hamburger Nachrichten*, "that the German navy has only 46 per cent of the strength of the English, a proportion which in respect of ships of the line varies somewhat in favor of Germany, while as to cruisers the variation is largely in favor of England. The fact that Germany has something more than half as many ships in building as England, is affected by this matter, that with us (Germany) the period of building is longer. For the building of a war vessel in Germany four years is reckoned as against 3½ years in England. So that part of the English 1911-ships is now ready."

The United States, whose preponderance in transports does not enter into the count, has now ceded the second place to Germany; and soon, it appears, will have a struggle with France for the third place. Russia is making great efforts to regain her former place in the race of armaments, as her large amount of new shipbuilding indicates. To all appearance, she will soon overtake both Japan and Italy, especially as a large proportion of her tonnage will be new, while theirs is obsolescent. The following figures showing the tonnage of over 20 years—which is regarded as old age for a battleship—are interesting:

	Tons.	Proportion of obsolescent to ready tonnage.
Great Britain.....	139,710	6.3
United States	102,800	11.8
Italy	96,730	24.0
France	87,150	11.9
Germany	71,815	7.0
Russia	55,330	16.9
Japan	51,260	9.2
Austria-Hungary	21,000	8.4

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Grain Shortage

The executive committee of the Lake Carriers' Association held a meeting in Cleveland on July 29 to consider the subject of grain shortage, which is one of the unsettled features of lake trade and has been a source of irritation to vessel owners for many years. Vessel owners have been compelled to guarantee the bill of lading, and if shortages in cargoes occurred they have had to pay for them out of their own pocket. During the present season these shortages have been numerous, ranging from 100 to 400 and even 600 bushels per cargo. With a freight rate as low as ¾ cent, and handling charges amounting to ½ cent, it can readily be seen that the vessel has nothing left with which to pay for shortage. When one is carrying grain at a loss, it is certainly irksome to dig down into one's own pocket and pay anywhere from $100 to $500 for a shortage in grain which never was put aboard at all. Of course, when over-runs occur the vessel gets the benefit of it, but it is no comfort to a vessel owner who has paid out good money for a shortage to know that some other vessel owner is getting a premium for an over-run. Shortages are more numerous than over-runs because the natural tendency is in that direction.

The reason that has always been advanced by the grain shippers against any change in present practice is that it will disturb the banking arrangement in drawing against bill of lading. Whatever there may have been in this contention in the early days, vessel owners maintain that there is nothing in it now, as the trade is in very strong hands financially. Some vessel owners argue that shortages should be eliminated altogether, and that the shipper should stand the natural waste incident to his own business. Other vessel owners would be satisfied with a uniform bill of lading, fixing the maximum shortage at ½ bushel per 1,000 bushels. That is the flax bill of lading. Flax is the most slippery of all grains, and if a wastage of ½ bushel per 1,000 bushels is a fair figure for that grain, it would be a very generous one for the other grains.

At the Cleveland meeting, President Livingstone was instructed to take the matter up with the Canadian vessel owners and the line managers of Buffalo, and have them appoint a committee to confer with a similar committee from the Lake Carriers' Association. The vessel owners announce that they are not going to let the subject drop this time.

Ore Shipments During July

Ore shipments in July were 5,784,514 tons as against 5,502,367 tons for June, an increase of 282,147 tons. It was expected that the increase would be something more than this but some of the docks, notably Superior, show a falling off. The movement in percentage is however creeping up. The movement to May 1 showed a decrease of 68 per cent from that for the corresponding period last year. On June 1 the movement represented a decrease of 47 per cent, on July 1, 30 per cent, and on Aug. 1, 29 per cent. The total movement to Aug. 1 was 15,408,630 tons as against 24,329,460 tons to Aug. 1 last year, a decrease of 8,920,830 tons. These figures should afford a pretty good index as to what the season's movement will be. If the movement for the remaining months of the year would equal that of last year, the total movement for the season would be 40,000,000 tons. However, each month this year with the exception of April, when only 269,686 tons were moved altogether, has been running from 2,500,000 to 3,500,000 tons less than the movement for the corresponding month last year, so that it may be fair to assume a proportionate decrease during the remaining months of the year, which would make the total season's movement work out in the neighborhood of 32,000,000 tons. It is likely, however, to be somewhat better than that though probably not a great deal. Furnace men have consistently stayed out of the market and do not manifest any disposition even now to place orders. Shippers have given up expecting a buying movement during the present month and do not look for much activity even in September.

Following were the shipments by ports during July and up to Aug. 1, with corresponding data for similar periods last year:

Port.	July, 1913.	July, 1914.
Escanaba	858,696	664,721
Marquette	496,725	297,413
Ashland	754,329	533,744
Superior	2,396,064	1,956,911
Duluth	1,938,716	1,169,410
Two Harbors	1,759,886	1,162,315
	8,204,416	5,784,514
1914 decrease		2,419,902

Port.	To Aug. 1, 1913.	To Aug. 1, 1914.
Escanaba	2,659,299	1,740,741
Marquette	1,556,501	681,361
Ashland	2,264,031	1,416,825
Superior	7,073,413	5,690,413
Duluth	5,934,664	2,949,286
Two Harbors	4,841,552	2,930,004
	24,329,460	15,408,630
1914 decrease		8,920,830

Commerce of Lake Superior

During July 8,830,256 tons of freight were moved through the canals at Sault Ste. Marie as against 8,588,081 tons during June, an increase of 242,175 tons. The movement of freight to Aug. 1 amounts to 25,680,973 tons as against 37,673,487 tons for the corresponding period last year, a decrease of 11,992,514 tons. Practically all commodities show a falling off, notably coal, ore and grain. Following is the comparative statement of freight moved to Aug. 1, 1914, with corresponding data for the preceding year:

	To Aug. 1, 1913.	To Aug. 1, 1914.
EAST BOUND.		
Copper, net tons	46,967	30,087
Grain, bushels	46,029,435	30,118,693
Bldg. stone, net tons	5,973	.....
Flour, barrels	3,878,131	3,795,812
Iron ore, net tons	23,320,802	14,739,927
Pig iron, net tons	16,034	11,575
Lumber, M. ft. B. M.	254,325	221,590
Wheat, bushels	65,259,854	55,788,822
Unclass. frght., net tons	2090,844	131,070
Passengers, number	18,557	15,501
WEST BOUND.		
Coal, anthracite, net tons	1,425,554	1,133,532
Coal, bituminous, net tons	7,986,881	5,906,840
Flour, barrels	363	517
Grain, bushels	400	.....
Mfctd. iron, net tons	182,728	130,541
Iron ore, net tons	23,240	.....
Salt, barrels	335,136	403,331
Unclass. frght., net tons	511,221	510,233
Passengers, number	20,420	17,501
SUMMARY OF TOTAL MOVEMENT.		
East bound, net tons	27,393,691	17,939,685
West bound, net tons	10,279,796	7,741,288
Total	37,673,487	25,680,973
Vessel passages	10,850	8,872
Registered tonnage	27,040,841	19,798,790

Lake Erie Ore Receipts

Out of a total movement of 5,784,514 tons of ore during July, 4,468,788 tons went to Lake Erie parts distributed as follows:

Port.	July, 1914.
Buffalo	432,794
Erie	37,863
Conneaut	1,130,829
Ashtabula	1,063,381
Fairport	296,833
Cleveland	1,011,372
Lorain	211,727
Huron	133,016
Sandusky	.....
Toledo	102,628
Detroit	9,415
Port Colborne	38,930
Total	4,468,788

Personal

James H. Mancor will on Sept. 1 resume his duties as principal surveyor for Lloyds with headquarters at New York and James French will on that date return to Glasgow as principal surveyor. H. R. McClelland, of Middlesboro, will succeed James Montgomerie in the work of approving plans at the New York office.

Johnson & Verdin, Lewes, Del., have abandoned their efforts to raise lightship No. 82 which sank off Point Abino, Lake Erie, in the great storm last November. They report the vessel to be deeply imbedded in the sand. No bids will be invited.

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New Cantilever Self-Stowing Hatch Support

Since the introduction of the sliding steel telescope hatch cover, now almost universally used on the modern freighters of the Great Lakes, much improvement has been made tending to simplification in the methods of operating the covers in opening, closing, holding down and making watertight, until the hatches as now constructed are almost considered standard and very little difference exists in the details of those produced by the various ship builders.

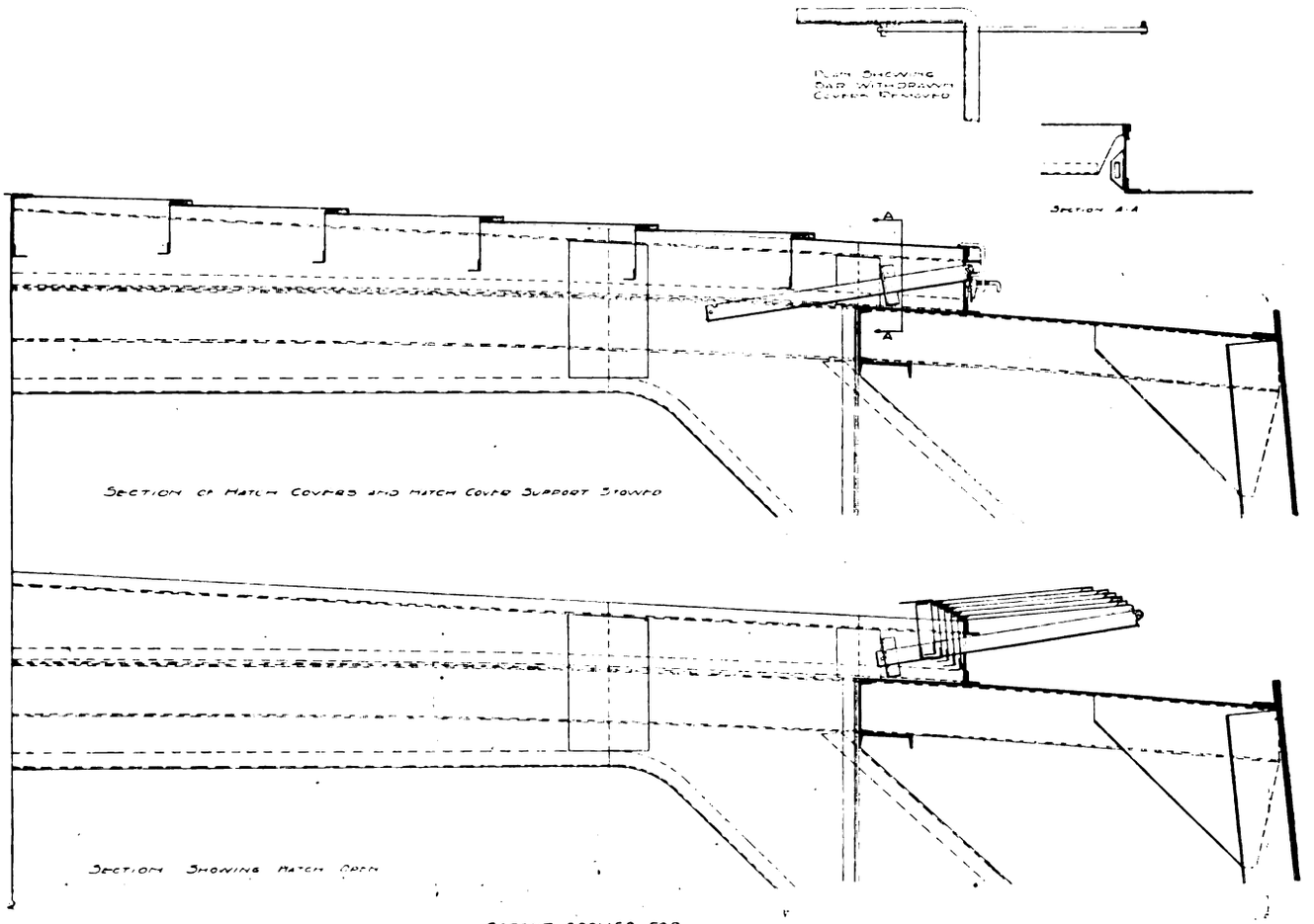
In one particular, however, the hatches do not seem to have received the careful attention deserved, and that is in the means for supporting the hatch sections or covers when in an open position. As generally constructed up to this time the hatch support consists of two round bars at the outboard end of each hatch bent to approximately a right angle; the inboard ends pivoted loosely through a hole in the hatch coaming angle while the outboard ends, slightly enlarged in diameter to ensure some degree of steadiness, rest upon the deck plating. In addition to the unstable support thus offered, this method has the decided objection of the supports being very much in evidence when the hatches are closed and battened down. As a rule no adequate provision can be arranged for their stowage and the result is that they are usually left lying loosely on deck, or even if secured in some makeshift manner to prevent their being lost overboard, are a menace to anybody on board who attempts to walk along deck, especially after dark.

With a view to an improvement in this regard to device here illustrated has been produced and an application for a patent has been filed by A. P. Rankin, assistant manager of the Manitowoc Ship Building & Dry Dock Co., of Manitowoc, Wis. The arrangement, which will be clearly understood from the illustrations, is extremely simple and is termed a cantilever, self-stowing hatch support. It consists of a rectangular steel bar, of sufficient stiffness, fitted inside and near the corner of each hatch, the outboard end being guided in a hole cut through the hatch coaming directly under the angle and the inboard in a suitable guide, preferably of angle iron. The outboard end of the bar is shaped so that in the closed position it will be entirely covered with the tarpaulin and will not interfere with the hatch batten and is fitted with a small shackle by means of which it is withdrawn to the supporting position, while the inboard end has a stop pin and notch which prevents it being drawn too far out and locks automatically in the full out position. A slight upward lift on the outboard end of the bar releases the notch and a push inboard sends the bar to its housed position inside the hatch, where it in no way interferes with the battening down.

It will be noticed then when in the supporting position, no part of the bars project over the hold proper and thus no interference is offered to the unloading machines.

During the past spring these supports were fitted throughout to the hatches of the steamer Indus of the Interlake Steamship Co.'s fleet, in connection with a re-construction of the vessel, carried out by the Manitowoc Ship Building & Dry Dock Co. and the unanimous verdict was that the new device was a great advance, and offered many advantages over the older method of supporting the hatch sections.

To test the stiffness of the supporting bars fifteen men stood on the outboard



DRAWING OF NEW CANTILEVER SELF-STOWING HATCH SUPPORT

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end of one of the piles of hatch covers in the open or supported position and jumped in unison without distorting the bars in the least.

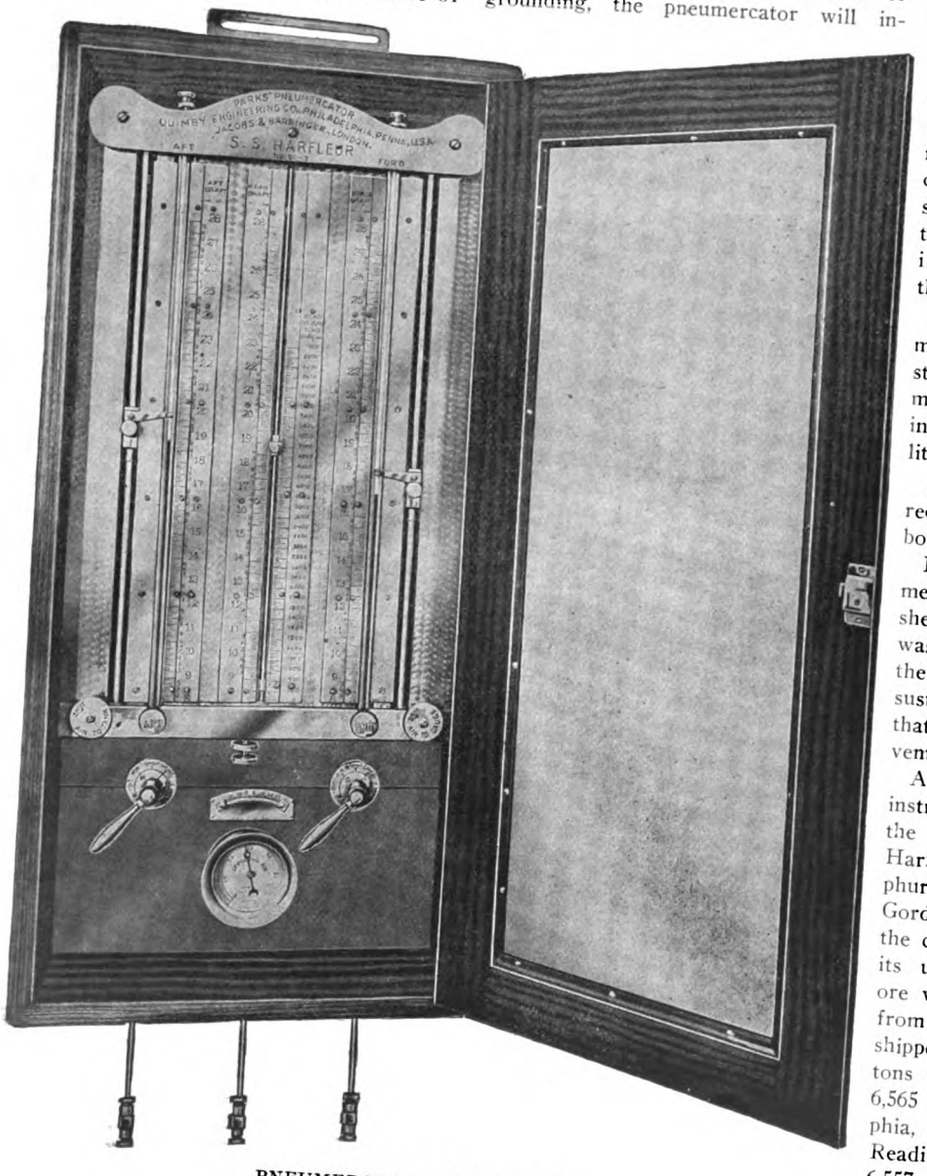
The new device is applicable to all vessels, new or old, having steel hatches and cost of the installation is extremely moderate. In fact, in new construction, these supports are found to cost less than those usually fitted. For permission to use, terms of royalty, etc., application should be made direct to the Manitowoc Ship Building & Dry Dock Co., at Manitowoc, Wis.

Pneumercator Weighing Machine

We have recently received a most interesting booklet, describing a new instrument, which is being placed on the market by the Pneumercator Company, of No. 118 Liberty street, New York. We are informed that the pneumercator has been thoroughly tested out in actual service, for over six months and that its operation has been most satisfactory.

Feeling that this instrument will be of great interest to the carriers of bulk cargoes on the Great Lakes, a description of the instrument itself and its operation is given herewith. The instrument is made in various models, Model D-1 and T-1, being shown in the illustrations.

Model D-1 is guaranteed to measure the forward and aft draft of a vessel to within one inch and to register the mean draft and corresponding tons displaced to the same degree of accuracy in either fresh or salt water. It also shows the trim and list of the vessel under all conditions. It weighs and measures bulk cargoes, such as coal, ore, grain, lumber, molasses and oil. It also weighs and measures bunkers of either coal or oil and will, at the same time, give a check on the consumption of same. This model is also of the greatest value as a navigating instrument as the trim and draft of the vessel can be ascertained at all times. In case of accident, due to collision or grounding, the pneumercator will instantly give warning if the ship is leaking badly, and after the pumps are started, will also show whether they are controlling the leak or not. The Model D-I contains two glass tubes in which the mercury, actuated by a column of air in the small pipes leading to the balance chambers rises in direct ratio to the draft of the ship. Beside each of these tubes is a carefully calibrated and legible scale, reading in feet and inches, the smallest division being usually one-half inch. The tops of these tubes are marked "forward" and "aft" respectively. By noting the height of mercury in these tubes the forward and aft draft are instantly read. Placed equidistant between these draft scales is a third scale calibrated on one side in feet and inches and on the other side in tons—2,240 pounds. By setting the knife-edge pointers, traveling on rods, exactly at the height of mercury in the two draft tubes the central knife edge automatically and accurately registers the mean draft and the corresponding tons displaced.



PNEUMERCATOR MODEL D-I

As the measurement of the submerged portion of the ship gives the weight of the ship and all it contains, it follows that it is possible to know the correct amount of cargo taken from the ship or put aboard the ship, between two successive readings of the draught, if the draught is known correctly, and this the pneumercator will show.

In reading the draught by the ordinary means from the marks on the stem and stern-post, an error of an inch is common, and an error of from 3 to 4 inches very often occurs if there is a little roughness of the water.

As the pneumercator shows the correct draughts, its use should prevent both overloading and underloading.

In case a ship is underloaded, it means, that on that particular voyage, she did not carry as much cargo as she was entitled to carry, and therefore both the shipper and the owner may have sustained a loss, which the information that the pneumercator gives, would prevent.

Among other vessels upon which this instrument has been installed are the steamers Herman Frasch, Frieda, Harfleur and Harley of the Union Sulphur Co.'s fleet and a letter from J. R. Gordon, traffic manager, indicates that the company is thoroughly satisfied with its usefulness. On the last cargo of ore which the steamer Harfleur carried from Narvik to Philadelphia the shipper's bill of lading called for 6,567 tons while the pneumercator registered 6,565 tons. The outturn at Philadelphia, weighed on the Philadelphia & Reading Railroad Co.'s scales, was 6,557 tons. On the last bunkering which the Harfleur made at Newport

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News while the Chesapeake & Ohio railway scale weight registered 475 tons the pneumercator registered 474 tons

Model T-1 is designed to measure the depth and volume of any liquid or semi-liquid in tanks or reservoirs, and has been adopted by the U. S. Navy for measuring bunker fuel oil in the double bottom tanks.

The U. S. Battleship New York has already been equipped with the device and installations are underway on the U. S. Battleship Oklahoma and Pennsylvania, building at Camden and Newport News, respectively, as well as the Argentine battleship Rividavia. The illustration of this model shows an annunciator attachment, which rings a bell and throws a signal, when the tanks are 95 per cent full, thereby preventing waste in bunkering.

The registering part of the device can be placed at any distance, either above or below the source of pressure and its accuracy is not affected by changes in temperatures, through which the connecting pipe line may be led.

Lagonda Co.'s New Plant

The Lagonda Mfg. Co., of Springfield, Ohio, are building a new addition to their already large and modern factory to accommodate their rapid growth and increase the facilities for specialized manufacture. In spite of the general business depression, the Lagonda Co. is forunate in having more business on hand at the present time and for the past two months than they have had for years. Of late the plant has been running night and day, not because of congestion or lack of manufacturing facilities, but because of the large volume of business that is coming in.

The Lagonda Mfg. Co. was originally organized as manufacturers of boiler tube cleaners. Specializing in this line, they have developed a complete line of turbine and mechanically driven scale removers to fit the many conditions met with in the different plants. Their present line of cleaners includes special types for boilers, condensers, economizers, evaporators and other straight and curved tube apparatus. They are also the designers and manufacturers of the Lagonda cleaning device for Stirling boilers, the well known Lagonda double-acting automatic cut-off valve and multiple water strainers.

Their present large and well equipped factory will be given over entirely to the manufacture of boiler tube cleaners and specialties, and the new addition will be equipped for handling the larger and heavier class of work, such as their automatic cut-off valves and multiple water strainers, the castings of which run into very large sizes.

The new addition will be 110 x 60 feet, of brick and concrete construction with a steel supported slate monitor roof. The approved steel window sash and frame will be used throughout, so that the daylight lighting will be as nearly perfect as possible. In addition to former equipment, a new 34-inch Gisholt Automatic Lathe, a large multiple drill and radial drill will be installed. A large 10-inch electric crane having a span of 36 feet will run the entire length of the building and over the railroad siding to facilitate handling of castings in the shop and for shipments. To cover the necessary demand for power, they are installing a new 100-horsepower gas engine.

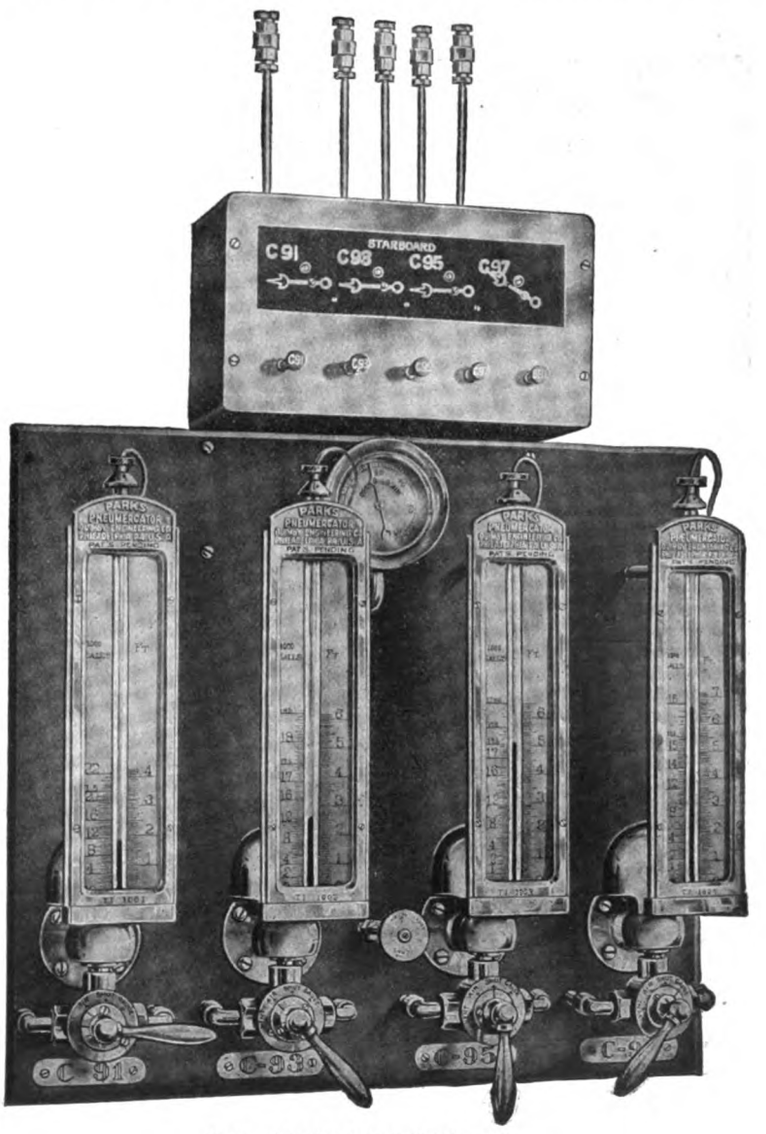
The Wonder of Wireless

Ronald Ferguson, senior wireless operator on the Empress of Ireland, which was sunk off Father Point, Quebec, May 29, gives the following interesting account of his experience:

Between the time of the collision and the time that the dynamos went out of commission, he says, we had only eight minutes and in that time were able to summon two boats. My cabin was on the top deck, and immediately after the shock, I saw lights passing. I ran to the wireless room and called to the stations: "Stand by for distress signals; have struck something."

The station at Father Point answered immediately, asking where we were. I replied we were twenty miles off Rimouski, after which water got into the stokehold and cut off the dynamos. I then switched to the receiver and got the following from Father Point: "O. K. Am sending Eureka and Lady Evelyn to your assistance."

The ship then went down and I swam around until rescued and taken aboard the Storstad. I immediately made my way to the Lady Evelyn which had wireless apparatus aboard, but no operator. The room was locked, but I broke through the window and tuned up the apparatus with Father Point.



PNEUMERCATOR MODEL T-I

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Ship Building in the United States

During the fiscal year ended June 30, 1914, there were built in the United States and officially numbered 1,291 vessels, of 311,578 gross tons, compared with 1,648 vessels, of 382,304 gross tons, for the same period of 1913.

The principal vessels are four American-Hawaiian Co. steamships, each of 6,600 gross tons, and three Grace Co. steamships, each of 6,300 gross tons, all for the Panama Canal trade, and averaging 4,000 net tons. The steamship Matsonia, for Hawaiian trade, 9,728 gross tons, is the largest vessel built in the United States since 1905, and the John D. Archbold, 8,374 gross tons, is the largest oil tanker yet built in the United States. On the Great Lakes ten steamers of over 1,000 tons each were built, the Alton C. Dustin, 7,978 gross tons, being the largest. Only three large schooners were built. In all, 38 vessels of over 1,000 tons each were built, aggregating 169,000 tons.

Following is the tabulated statement:

	Atlantic and Gulf.		Porto Rico.		Pacific.		Hawaii.		Great Lakes.		Western Rivers.		Total.	
WOOD:—	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.
Sailing	47	12,251	2	43	1	7	..	....	....	.....	....	.....	50	12,301
Steam	364	11,472	2	27	238	14,679	3	103	88	2,513	118	3,278	813	32,072
Unrigged	189	53,712	..	..	73	6,893	..	....	25	3,605	7	494	294	64,704
Total	600	77,435	4	70	312	21,579	3	103	113	6,118	125	3,772	1,157	109,077
METAL:—														
Sailing	5	1,762	..	..	..	.....	..	....	....	.....	....	.....	5	1,762
Steam	61	124,762	..	..	11	13,470	..	....	23	51,020	9	566	104	189,818
Unrigged	11	5,286	..	..	1	368	..	....	8	3,557	5	1,710	25	10,921
Total	77	131,810	..	..	12	13,838	..	....	31	54,577	14	2,276	134	202,501
TOTALS:—														
Sailing	52	14,013	2	43	1	7	..	....	....	.....	....	.....	55	14,063
Steam	425	136,234	2	27	249	28,149	3	103	111	53,533	127	3,844	917	221,890
Unrigged	200	58,998	..	..	74	7,261	..	....	33	7,162	12	2,204	319	75,625
Grand total..	677	209,245	4	70	324	35,417	3	103	144	60,695	139	6,048	1,291	311,578

During the corresponding year ended June 30, 1913, 1,648 sailing, steam and unrigged vessels of 382,304 gross tons were built in the United States and officially numbered as follows:

	Atlantic and Gulf.		Porto Rico.		Pacific.		Hawaii.		Great Lakes.		Western Rivers.		Total.	
WOOD:—	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.	No.	Gross.
Sailing	64	14,578	11	157	5	712	..	....	1	5	....	.....	81	15,452
Steam	391	17,510	3	103	288	17,302	2	75	164	3,182	157	3,957	1,005	42,129
Unrigged	220	62,496	..	....	120	10,627	..	....	34	4,360	40	501	414	77,984
Total	675	94,584	14	260	413	28,641	2	75	199	7,547	197	4,458	1,500	135,565
METAL:—														
Sailing	2	953	..	....	....	.....	..	....	3	7,332	....	.....	5	8,285
Steam	58	138,617	..	....	16	17,533	..	....	36	68,203	11	1,114	121	225,467
Unrigged	8	5,162	..	....	....	.....	..	....	9	6,102	5	1,723	22	12,987
Total	68	144,732	..	....	16	17,533	..	....	48	81,637	16	2,837	148	246,739
TOTALS:—														
Sailing	66	15,531	11	157	5	712	..	....	4	7,337	....	.....	86	23,737
Steam	449	156,127	3	103	304	34,835	2	75	200	71,385	168	5,071	1,126	267,596
Unrigged	228	67,658	..	....	120	10,627	..	....	43	10,462	45	2,224	436	90,971
Grand total..	743	239,316	14	260	429	46,174	2	75	247	89,184	213	7,295	1,648	382,304

Ore Dock at Constable Hook

Preliminary contracts for the construction of what is to be the largest iron ore dock in the world have been let by the Lehigh Valley railroad. The dock is to be located at Constable Hook, N. J., and will be employed to transfer ore from incoming ocean vessels into cars for distribution to blast furnace and steel plants along the line of the Lehigh Valley. For a time, it is understood, the proposed dock will be used mainly for receiving ore from the Bethlehem Steel Co.'s mines in Chile, destined for that company's plant in South Bethlehem, Pa. This arrangement is expected to prove very advantageous to the Steel company, which has provided for transportation of the ore in Swedish vessels at extremely low rates.

The contract for the dredging and excavation of the site has been let to G. H. Breymann Bros., East Boston, Mass., while the contract for the erection of the dock, which is to be of timber and concrete, was awarded to Henry Steers, Inc., New York. The Bethlehem Steel Co. will manufacture the unloading machinery. The dock is to be 1,150 feet long, with a basin 200 feet wide, while a channel insuring 35 feet depth at low tide will be dredged, making it possible to dock the largest vessels. No details have yet been given out as to the character of the unloading machinery, but it is understood two cranes will work on a vessel at one time, each having maximum unloading capacity of 500 tons per hour. It is expected that the dock will be ready for operation about the middle of 1915.

The location of the new pier is in what is known as New York harbor, and is alongside the main line of the Lehigh Valley. For serving it, the railroad will lay out a switching yard which will have a capacity for 330 cars. The decision to erect it was brought about by the shortening of sea routes by the Panama canal. All the Chilean ore will come through the canal.

July Lake Levels

The United States Lake Survey reports the stages of the Great Lakes for the month of July, 1914, as follows:

Lakes	Feet above mean sea level
Superior	602.68
Michigan-Huron	580.74
Erie	572.83
Ontario	246.72

Lake Superior is 0.19 foot higher than last month, 0.04 foot higher than a year ago, 0.18 foot above the average stage of July of the last ten years, 1.14 feet below the high stage of July, 1876, and 1.20 feet above the low stage of July, 1879. The average stages of the last ten years indicate that the August level will be 0.2 foot higher.

Lakes Michigan-Huron are 0.14 foot higher than last month, 0.54 foot lower than a year ago, 0.38 foot below the average stage of July of the last ten years, 2.84 feet below the high stage of July, 1876, and 0.84 foot above the low stage of July, 1896. Average stages of the last ten years indicate that the August level will be 0.1 foot lower.

Lake Erie is 0.21 foot lower than last month, 0.74 foot lower than a year ago, 0.07 foot below the average stage of July of the last ten years, 1.58 feet below the high stage of July, 1876, and 1.37 feet above the low stage of July, 1895. Average stages of the last ten years indicate that the August level will be 0.2 foot lower.

Lake Ontario is 0.19 foot lower than last month, 1.11 feet lower than a year ago, 0.35 foot below the average stage of July of the last ten years, 2.00 feet below the high stage of July, 1862, and 2.13 feet above the low stage of July, 1895. Average stages of the last ten years indicate that the August level will be 0.3 foot lower.

The Navy Department has awarded contract to the Staten Island Ship Building Co., Port Richmond, N. Y., for two tugs for Panama canal service, to be 125 feet long over all, 112 feet keel, 30 feet beam and 17 feet deep.

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Traffic of Suez

The following table shows the growth in traffic through the Suez Canal since 1884:

Years.	—Passages— No.	Tonnage carried.	Receipts from special navigation charges.
1884	3,284	5,871,501	$11,315,351
1885	3,624	6,335,753	11,591,051
1886	3,100	5,767,656	10,570,818
1887	3,137	5,903,024	10,807,093
1888	3,440	6,783,187	12,431,615
1889	3,425	6,640,834	12,166,261
1890	3,389	6,890,094	12,627,455
1891	4,207	8,698,777	15,737,381
1892	3,559	7,712,029	14,014,369
1893	3,341	7,659,060	13,290,551
1894	3,352	8,039,175	13,918,574
1895	3,434	8,448,383	14,655,331
1896	3,409	8,560,284	14,762,129
1897	2,986	7,899,374	13,687,253
1898	3,503	9,238,603	15,952,882
1899	3,607	9,895,630	17,118,821
1900	3,441	9,738,152	16,844,747
1901	3,699	10,823,840	18,727,744
1902	3,708	11,248,413	19,497,855
1903	3,761	11,907,288	19,481,887
1904	4,237	13,401,835	21,843,151
1905	4,116	13,134,105	21,350,604
1906	3,975	13,445,504	20,013,676
1907	4,267	14,728,434	21,771,038
1908	3,795	13,633,283	20,341,468
1909	4,239	15,407,527	22,726,693
1910	4,533	16,581,898	24,550,236
1911	4,969	18,324,794	25,289,800
1912	5,373	20,275,120	25,655,363
1913	5,085	20,033,884	23,736,948

During the period covered by the foregoing statistics the number of vessels passing through the canal increased by 55 per cent, the total tonnage by 241 per cent, and receipts from special navigation charges by about 110 per cent. The average tonnage per vessel was 1,788 in 1884, 2,033 in 1890, 2,460 in 1895, 2,830 in 1900, 3,191 in 1905, 3,658 in 1910, and 3,940 tons in 1913.

Items of General Interest

All bids received for the army harbor steamer, which were opened recently, have been rejected. The United Engineering Works, San Francsico, was the lowest bidder, at $129,000. No reason is given for the action of the War Department, but it is believed that it did not contemplate so great an expenditure, and that the designs of the boat will be changed to bring lower estimates.

The lighthouse tender Laurel was recently launched at the yard of the Spedden Shipbuilding Co., Baltimore, Md. The Laurel is 104 feet over all, 22 foot beam, 8 feet 10 inches deep. Her propelling machinery consists of a triple-expansion engine, supplied by the Bureau of Lighthouses, and the accommodations for the officers and crew are unusually commodious for a craft of this type.

The Contra Costa Chamber of Commerce has made an appeal to the United States government for the dredging of Carquinez Strait from Bull's Head point to New York landing, a distance of 20 miles. It is estimated that the dredging will cost about $1,000,000. The depth desired is 24 feet.

The name of the three steamers formerly operated by the Commercial Steamship Co. have been changed. The Sheldon Parks is now the Edward Uhrig; the Abraham Stearn is now the E. N. Saunders Jr., and the J. Q. Riddle is now the J. J. Turner. Messrs. Uhrig and Saunders are coal men and Mr. Turner is the first vice president of the Pennsylvania railroad. These steamers are now being painted in uniformity with the colors of the Hanna fleet and the doors and deadlights in the deck houses are being strengthened with iron plating and iron shutters.

James M. Smith has resigned as general manager of the Collingwood Ship Building Co., Collingwood, Ont.

The 75-foot tug Joseph Seep, built for the Penn Mex Fuel Co., of Pittsburgh, was recently delivered to her owners by the Greenport Basin & Construction Co., Greenport, L. I., N. Y. Contract for this vessel called for delivery within 100 working days, but she was completed in 87 days. The craft is fitted with two inverted compound engines, 8 inches by 18 inches by 12-inch stroke, furnished by the Portland Co., Portland, Me.: an Almy watertube boiler and Kingsford Foundry pumps, furnished by the Kingsford Foundry Co., Oswego, N. Y. Communication between the pilot house and engine room was installed by Charles Cory & Son, New York, and the life saving apparatus by Thomas Drein & Son Co., Wilmington, Del. She will burn oil as fuel. Her speed on trial was 11.08 knots.

Thomas Marks & Co. moved on Aug. 1 from the Imperial Life building to the new Dominion Bank building, corner King and Yonge streets, Toronto, Ont.

Lt. Col. Mason M. Patrick, United States government engineer, expects that the third lock at the Sault on the American side will be ready to go into commission on Oct. 1.

SUMMARY OF NAVAL CONSTRUCTION.

Name of vessel.	Contractor.	Per cent of completion. July 1, 1914. Total.	July 1, 1914. Per cent on ship.	June 1, 1914. Total.	June 1, 1914. Per cent on ship.
BATTLESHIPS					
Nevada	Fore River Ship Building Co.	69.7	60.7	67.0	57.0
Oklahoma	New York Ship Building Co.	71.6	68.7	69.0	65.6
Pennsylvania	Newport News Ship Building Co.	37.4	28.8	33.8	24.7
	New York Navy Yard	17.4	14.3	13.1	10.6
DESTROYERS					
Downes	New York Ship Building Co.	95.3	95.3	95.3	95.3
O'Brien	Wm. Cramp & Sons	70.7	67.0	68.0	64.4
Nicholson	Wm. Cramp & Sons	69.4	65.7	66.4	62.4
Winslow	Wm. Cramp & Sons	69.0	65.4	63.2	59.0
McDougal	Bath Iron Works	Del'v'd, 6, 16, 14		95.8	95.7
Cushing	Fore River Ship Building Co.	50.8	45.5	44.8	39.4
Ericsson	New York Ship Building Co.	73.5	73.0	69.6	68.9
Tucker	Fore River Ship Building Co.	10.9	4.4	9.7	3.9
Conyngham	Wm. Cramp & Sons	8.4	2.2	7.7	1.9
Porter	Wm. Cramp & Sons	8.2	2.2	7.6	1.9
Wadsworth	Bath Iron Works	35.7	29.7	24.8	19.1
Jacob Jones	New York Ship Building Co.	13.3	5.2	9.9	1.8
Wainwright	New York Ship Building Co.	13.3	5.2	9.9	1.8
DESTROYER TENDERS					
Melville	New York Ship Building Co.	55.5	52.5	50.6	49.4
SUBMARINES					
G-4 (2)	American Laurenti Co. (Philadelphia)	96.4	95.5	96.4	95.5
G-2 (1)	Lake Tow Boat Co. (Bridgeport)	89.7	89.7	89.7	89.7
G-3 (1)	Lake Tow Boat Co. (Bridgeport)	82.3	81.9	82.3	81.9
K-3	Electric Boat Co. (San Francisco)	96.8	96.8	94.2	94.2
K-4	Electric Boat Co. (Seattle)	96.8	96.7	94.2	94.1
K-5	Electric Boat Co. (Quincy)	97.8	97.8	95.7	95.7
K-6	Electric Boat Co. (Quincy)	97.8	97.8	95.7	95.7
K-7	Electric Boat Co. (San Francisco)	93.3	92.8	91.6	91.1
K-8	Electric Boat Co. (San Francisco)	91.8	91.0	90.0	89.5
L-1	Electric Boat Co. (Quincy)	40.5	35.7	34.6	29.3
L-2	Electric Boat Co. (Quincy)	40.3	35.4	35.0	29.7
L-3	Electric Boat Co. (Quincy)	39.3	33.9	34.4	29.4
L-4	Electric Boat Co. (Quincy)	39.1	33.7	34.0	28.5
L-5	Lake Tow Boat Co. (Bridgeport)	22.0	18.4	14.2	11.1
L-6	Lake T. B. Co. (Long Beach, Cal.)	17.9	14.1	11.5	6.9
L-7	Lake T. B. Co. (Long Beach, Cal.)	16.6	12.7	11.0	6.3
M-1	Electric Boat Co. (Quincy)	29.3	24.0	25.7	20.5
L-8	Portsmouth, N. H. Navy Yard	0.0	....	0.0	....
L-9	Electric Boat Co. (Quincy)	7.7	3.6	5.3	2.3
L-10	Electric Boat Co. (Quincy)	7.7	3.6	5.3	2.3
SUBMARINE TENDERS					
Fulton	New London S. & E. B. Co. (Quincy)	74.0	72.7	67.4	64.8
Bushnell	Seattle Construction & D. D. Co.	41.7	32.4	36.6	27.1
FUEL SHIPS					
Kanawha	Mare Island Navy Yard	65.0	64.5	57.1	56.4
Maumee	Mare Island Navy Yard	31.8	27.0	28.4	23.8
MISCELLANEOUS					
Supply Ship No. 1	Boston Navy Yard	0.0	....	0.0	....
Transport No. 1	Philadelphia Navy Yard	0.0	....	0.0	....
PANAMA CANAL COLLIERS					
Ulysses	Maryland Steel Co.	23.4	15.8	....	....
Achilles	Maryland Steel Co.	20.0	10.8	....	....

(1) Contracts forfeited, vessels being completed New York Yard.
(2) Conditionally delivered at Philadelphia Yard Jan. 22, 1914.

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Empress of Ireland-Storstad Case

Inquiry as to Why the Empress of Ireland Sank so Quickly After the Impact

AFTER determining the responsibility for the Empress of Ireland-Storstad disaster the Mersey court of inquiry added:

"But a question of much greater public interest and importance remains to be considered, viz.: why the ship sank so quickly and what steps, if any, can be taken to prevent the terrible consequences which so often follow from such disasters."

In considering this phase of the accident the court said:

Watertight Doors

Definite evidence was given to show that the vertical sliding watertight door providing communication between engine room and after boiler room at the stokehole level was effectively closed after the collision took place; but no information was available as to whether the reserve bunker doors higher up on the same bulkhead, or that on the forward bulkhead of the fore boiler room, between the lower and main decks, connecting the reserve bunker with the steerage passenger or cargo space, were open or shut, although it is presumed they were shut. An unsuccessful attempt was made to close the vertical sliding door between the two boiler rooms at the stokehole level, but no evidence was available with reference to the two doors on the same bulkhead between the lower and main decks.

Immediately above the main deck, as set out in the detailed statement of the vessel's construction, at least one horizontal sliding watertight door was fitted in each of the bulkheads numbered 3 to 9, and no evidence was forthcoming to show that any of these doors were closed at the moment of the collision. It was stated that some of the doors on the port side were closed after the collision, as the gear for actuating these were adjacent to the steward's quarters and readily accessible; but attempts made to close the starboard door of the third class dining saloon, and the door on the same side of the ship at the fore end of the second class accommodation, were ineffectual.

The door last-named was vitally important, since it was in a bulkhead which completed, above the main deck, the watertight bulkhead at the after end of the boiler compartments. It may be mentioned that the operation of closing the doors on the port side would be facilitated by any list to starboard, the arrangement being such that the weight of the door under the circumstances mentioned tended to close it; but the contrary was true of those on the starboard side. One witness mentioned that he either heard or saw some gear for closing watertight doors working, and from his position at the time, it is possible that the door at the after end of the second class lavatory accommodation on the starboard side was closed.

Practically all the doors between main and upper decks must necessarily have been open under ordinary circumstances for convenience of communication between cabins and dining saloons, etc., and therefore in view of the fact that the only two known attempts to close doors on the starboard side were unsuccessful, it seems practically certain that other attempts on that side, if made, had a similar result, and that nearly all the watertight doors on the starboard side between main and upper decks remained open after the collision.

Port Holes or Sidelights

It was stated in evidence that all the lower ports would be closed at the time of the collision, while others higher up would be open. Other evidence showed that some ports in cabins between the main and upper decks were closed some hours before the collision, and that others in the alleyways between the same decks were open at that time. It is certain that some ports at this level were open after the collision, for one passenger, in the third class accommodation forward, deposed to be awakened by water falling on his bed from the open porthole, and others testified to seeing water pour through port holes in alleyways and elsewhere near the after end of the ship.

Evidence was also forthcoming to show that water entered through open ports inside between the upper and shelter decks.

Nature and Extent of the Damage Resulting from the Collision, and Position at Which Empress of Ireland was Struck

So far as the Empress of Ireland is concerned, no direct evidence as to the extent of the damage was available since no survivor from the Empress of Ireland nor anyone from the Storstad has testified to having seen the torn side of this vessel. Divers report that the sunken liner is lying on her starboard side at a considerable inclination from the horizontal, and with her starboard bilge buried in mud. No examination of the damage has been possible up to the present time, and the engineer in charge of the diving operations considers such examination a very hazardous and perhaps impossible undertaking. Information on this point can therefore only be gathered from an examination of the damaged bow of the Storstad. This vessel was more extensively damaged on the starboard than on the port bow, as first contact with the Empress of Ireland was made on that bow; but on the port side also the injuries were severe.

The shelter deck of the Storstad apparently entered just below the shelter deck of the Empress of Ireland, the stem head of the former above the shelter dack being broken off. The vertical depth of the hole made in the side of the Empress of Ireland must have been approximately 46 feet, about 25 feet of this being below water at the time of the collision. It is not possible to determine the lateral dimensions of the aperture, as there may have been some longitudinal ripping action, which would produce a wider hole than one caused by a single direct blow. But, excluding such action and estimating the size of the hole from the position of the limiting marks of injury on Storstad, the conclusion has been reached that the area below water of the hole made in the side of the Empress of Ireland was, immediately after the collision, no less than 350 square feet.

The position at which the Storstad came into contact with the Empress of Ireland can be determined with some precision. In the first place a cabin number plate (No. 328) from the last named vessel, was found after the collision on the shelter deck of the Storstad, near the stem. The cabin bearing this number was an outer one situated between the upper and shelter decks of the Empress of Ireland slightly abaft amidships, the door being 7 feet in from the side. Further, the engineer on watch in the forward boiler room stated that 20 seconds after the collision " water rushed through the starboard No. 2 bunker," entering the

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stokehole through the full area of the bunker doorway; while the engineer on duty in the after boiler room noticed water pouring in in large volume out of the forward bunker door on the starboard side almost immediately after the shock of the impact was felt.

From these facts it is clear that the Empress of Ireland was damaged in the immediate vicinity of the watertight bulkhead fitted between the two boiler rooms, while the stem of the Storstad must have penetrated into the side of the Empress of Ireland sufficiently far to reach the door of the cabin before mentioned. This door was 16 feet abaft the bulkhead, the watertightness of which was destroyed.

Effect of the Collision on the Stability of the Empress of Ireland

Just before the collision, the mean draft of the vessel was 27 feet; she was carrying 1,160 tons of cargo, 2,300 tons of coal, and all the double bottom tanks were filled with either fresh or salt water. Her metacentric height under these circumstances was just over 40 inches, and with all port holes closed her stability at large angles of keel was ample.

The immediate effect of the damage referred to above was to destroy the watertightness of the bulkhead dividing the two boiler rooms, and to place these compartments (with a combined length of 175 feet) in communictaion with the sea. From an examination of the damage done to the bow of the Storstad it has been estimated that the area of the hole made in the side of Empress of Ireland was sufficient to allow an initial inflow of water into the vessel of 265 tons per second, supposing such inflow unobstructed. Coal and other obstructions would lessen this rate, but it is certain that in a very short time both boiler rooms would be entirely flooded up to the water level outside, as from the evidence is known to have been the case. Flooding these compartments involved a mean sinkage of practically 9 feet, and assuming, in the first place, that the water as it rose in these compartments was symmetrically distributed with reference to the middle line of the ship, this sinkage would take the main deck 4 feet below the water at amidships, and this deck would be below water throughout its length except for a comparatively short portion forward. Under these conditions of damage the ship would still have had a metacentric height of just over two feet, and would have continued to float upright had the watertight doors in bulkheads above the main deck bounding the damage length been closed. Under the actual conditions prevailing at the time of the collision, however, with the side of the vessel, where struck open to the sea above the main deck, and with bulkhead doors on the starboard side of that deck open, water could find its way freely over that deck, thus wholly destroying the vessel's stability and causing her to capsize and founder.

For convenience of description it has been assumed in the foregoing that the entering water was distributed symmetrically with reference to the middle line of the ship, but initially this was certainly not the case. The Storstad penetrated the starboard side of the Empress of Ireland at the cross coal bunker fitted between the two boiler rooms, this cross bunker being subdivided athwartships by the watertight bulkhead separating the boiler rooms. This bunker was also divided at the middle line of ship, below the lower deck level, by longitudinal watertight or dusttight communication and steam pipe passages, connected by a non-watertight partition. The part of this cross block which was in the forward boiler room was connected on the starboard side to a longitudinal bunker running to a cross-block at the forward end of that room, this latter being divided below the lower deck and at the middle line of ship, by a non-watertight longitudinal partition. Very similar arrangements existed abreast the after boiler room, details of these being given in the portion of this report which deals with the construction of the ship. The bunker bulkheads of this vessel, in accordance with usual practise, were not watertight. It may be added that the arrangement of coal was practically symmetrical with reference to the middle line of ship.

There is no evidence that the Storstad destroyed any portion of the bunker bulkheads, so that very shortly after the impact a large quantity of water must have entered the bunkers on the starboard side for the whole length of the boiler rooms, which water was able to escape only through bunker doors into the boiler rooms and relatively slowly also across the middle line partitions in coal bunkers to the port side of the vessel. Under these circumstances the ship would at once commence to list to starboard, the precise angle of inclination at any time being dependent upon the actual rate of inflow of water and the rate of its distribution across the ship. In the absence of this information a close estimate of the list is not possible; but making reasonable approximations an inclination of some 15 to 20 degrees appears probable under these circumstances. From such a list the vessel might have recovered as the water got to the port side, if all port holes, and all watertight doors in bulkheads bounding the boiler compartments up to upper deck, had been closed; but with doors and sidelights open to the extent known to have obtained after the collision, water was free to enter other compartments and the final capsizing and foundering became inevitable.

Thus, summarizing the foregoing, it will be seen that while the entry of water on the starboard side naturally induced a tendency to heel to that side, the heeling effect was increased by the fact that the bunker bulkheads retarded the free flow of water across the ship. Very shortly after the collision the vessel must, for this reason, have listed to a considerable angle, and this, combined with the bodily sinkage of the vessel, would speedily immerse the side ports known to be open between main and upper decks. As the sinkage, due to the entry of water through the injured side and through the port holes, continued, water would, under the actual circumstances existing at the time of the collision, obtain free access to the main dock, with the results already indicated.

Bolinders Crude Oil Engine

Messrs. J. & C. G. Bolinders Co., Stockholm, Sweden, manufacturers of Rundlof's patent crude oil engines have, in twenty years' development of this engine, succeeded in selling many thousand horsepower in the several countries of the world both in marine and stationary types.

Realizing the great possibilities of industrial development in the United States after a thorough study of conditions by their managing director Mr. Carl Pape of Berlin, they have arranged an American company viz. The Bolinders Co., 30 Church street, New York, and are entering into an active campaign for business in the United States. Mr. W. R. Haynie is manager of the American company.

The distinctive features of this engine are very attractive in that it is a 2-cycle engine without valves and is of the simplest possible design and in the case of the marine engine it is direct reversible without gears or supplementary devices.

The oil tank steamer Kanawha was launched on July 12 from the Mare Island navy yard. This vessel, which is designed for fueling ships of the United States navy, is 475 feet over all, 455 feet long, 56 feet beam and 33 feet 11 inches deep. The loaded mean draught is 26 feet 4 inches. She will have two sets of triple-expansion engines, 23, 39½ and 68½ inches diameter by 48-inch stroke supplied with steam from four watertube boilers.

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Black Rock Ship Canal

The Black Rock ship canal at Buffalo will be opened to commerce during the present month, and the war department has issued rules and regulations governing it as follows:

"No vessel of 100 gross tons or over shall navigate the Black Rock canal at a rate of speed greater than five statute miles per hour. This rate will require elapsed time to navigate between designated points, as follows: From south canal limit to Ferry street bridge, 22½ minutes; from Ferry street bridge to International bridge, 13½ minutes.

"No vessel shall pass or approach within one-quarter mile of a vessel bound in the same direction in the canal. Tugs without tows and boats under 100 gross tons are exempt from this rule.

"No tow shall enter or pass through the canal with a towline more than 400 feet in length.

"No vessel or boat shall anchor in or moor along the canal within the limits of any portion of the 23-foot channel; and no business, trading or landing of freight or baggage will be allowed on or over the canal lands or structures, except such articles as may be readily carried in the hand, without permission of the engineer officer or his agent.

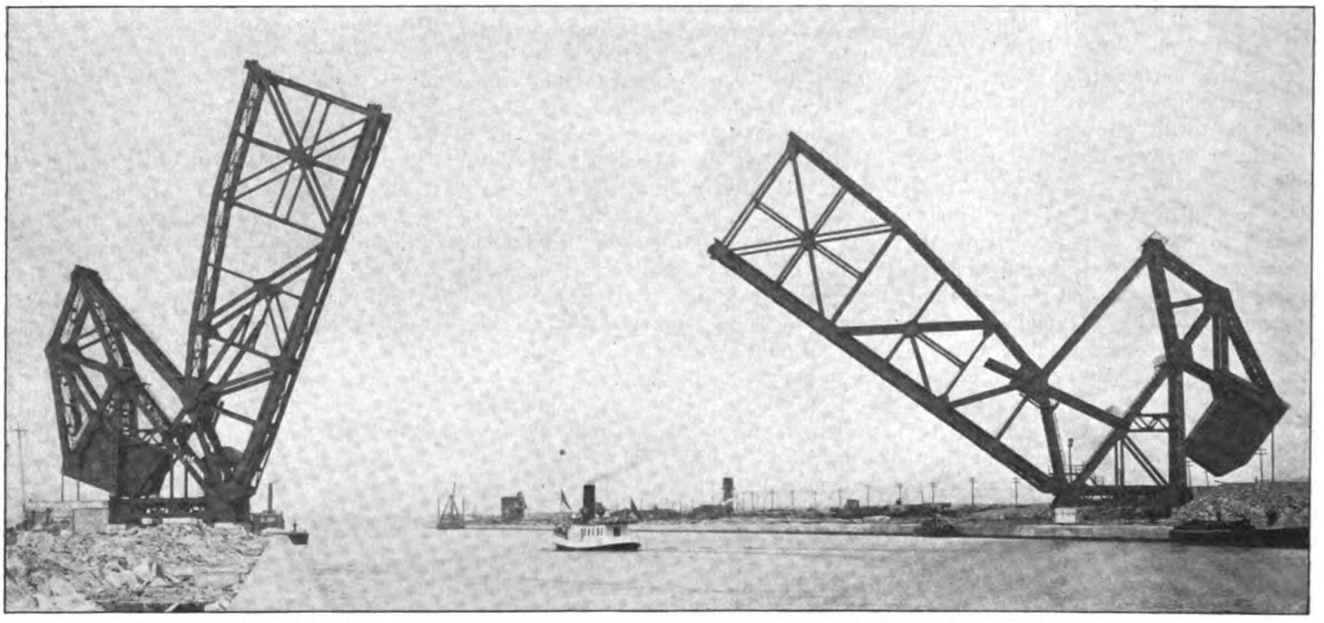
"All vessels and boats which cannot pass under the Ferry street bridge shall reduce speed on approaching the bridge sufficient to enable them to come to a dead stop, without touching the bridge, in case the movable span cannot be lifted. If the wind is dangerously strong, passage of the bridge shall not be attempted by large vessels without the aid of a tug or tugs.

"Vessels and boats bound down (north) shall have the right of way and passage through the bridge over those upbound (south).

"All vessels and boats desiring passage through the bridge shall signal therefore by one long and two short whistle-blasts.

"In case the bridge cannot be lifted for any cause, the bridge operator shall answer a vessel signal by giving five short whistle blasts; and the vessel shall then be stopped until the bridge is ready to be lifted, when the bridge operator shall give the whistle signal for passage and the vessel may proceed.

"Vessels and boats shall not enter or leave until the lock gates are fully in their recesses, and the lockmaster has given directions for starting."



STRAUSS BASCULE BRIDGE OVER THE NEW AMERICAN CANAL AT SAULT STE MARIEI

Bridge Over New Sault Canal

The new Strauss bascule bridge over the new canal on the American side at Sault Ste. Marie leading to the third and fourth locks is now in commission. The photograph accompanying shows the tug Alfred Noble passing through the bridge. She was selected to be the first to pass through owing to the distinguished name she bears. This bridge is said to have a longer span than any other jack-knife bridge in the world.

The Secretary of War has announced that The Panama Canal will be opened to traffic on Saturday, August 15, to vessels drawing not to exceed 30 feet of water. This stipulation is made, because of the conditions at Cucaracha slide, which, although greatly improved, would not admit of the passage of vessels with absolute safety drawing a greater depth of water. This restriction, however, probably does not affect any vessel now using the Panama route regularly, either in the Atlantic or Pacific.

The Terry Steam Turbine Co., Hartford, Conn., have installed new machine tools and increased the number of men in their employ in order to take care of the great amount of business now on hand. The Terry company is just finishing an order for 19 turbines for the Italian navy and in addition to this has received an order for eight more, as well as an order for twenty-four from Messrs. N. Odero & Co., Sestria Ponente, Italy. Another order recently booked by the company is for 20 turbines for the new generating station of the Philadelphia Electric Co. Numerous other orders call for delvieries in the United States, Canada, Cuba, Mexico and South America.

The Moore & Scott ship yard, Oakland, Cal., have been awarded contract for a new ferryboat, 230 feet by 63½ feet, by 19½ feet, by the San Francisco & Oakland Railways Co. The propelling machinery will consist of compound engines with four cylinders and steam will be furnished by four Babcock & Wilcox water tube boilers. The vessel will have accommodations for 2,500 to 3,000 passengers, will have a speed of 15 knots and will be ready for service next March.

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Accidents to Lake Vessels

Herewith is published the list of accidents that have occurred on the Great Lakes from January 1 to August 1. Eight total losses have occurred, though only two of these were important in a financial sense—the Benjamin Noble and the Gilbert. The Noble foundered in a heavy gale on Lake Superior on April 27 on the first trip of the season, carrying down her crew of 20 men; the Gilbert was sunk in collision with the Caldera in Lake Huron on May 22. Five vessels became total losses through fire—the barge Dorcas Pendell, which had been lying on the beach at Harbor Beach, Lake Huron, all winter; the steamer R. L. Fryer, on April 21, at Marine City; the City of Rome, on May 7, in Lake Erie; the steamer Berthier, at Montreal, on May 25, and the steamer Emma Thompson, on Ennis island, Georgian Bay, on May 28. The schooner William Jamison sank in Lake Ontario on April 29, drowning her crew of six.

The more important accidents include those of the Western Star which stranded in the Detroit river on April 22, damaging about 13 plates; the steamer Charles A. Weston, which ran ashore at Point Sanilac on May 2, damaging about 50 plates; the George F. Baker, which ran on the rocks at Eagle river, Lake Superior, May 4, damaging about 62 plates; and the Mataafa and barge Hartnell which were blown, the Mataafa on the pier, and the Hartnell on the beach at Duluth on June 27. Following is the tabulated list:

Date.—Name of Vessel.	Nature of Accident.	Place.
Jan. .. Str. F. B. Squire	Leaked; storage cargo had to be unloaded; part of grain damaged.	Buffalo.
Jan. .. Bge. Dorcas Pendell	Destroyed by fire thought to have started from overheated stove in shipkeeper's quarters. Steamer was lying on beach, having been wrecked in November, 1913, storm.	Harbor Beach, Lake Huron.
Jan. 11 Str. Sir Thos. Shaughnessy	Parted lines in storm and grounded; pumped out and towed out under west breakwater.	Cleveland, O.
Feb. 4 Str. Stadacona	Ran aground after breaking mooring line and striking dock.	Port Huron, Mich.
Feb. 6 C. F. Marquette & Bessemer No. 2	Starboard shaft damaged; docked for repairs at Ashtabula.	Connaut, O.
Feb. 11 Str. Arthur Orr	Slightly damaged by fire.	Chicago, Ill.
Feb. 16 Str. F. Schlesinger	Cabin caught fire from overheated stove; damage about $200.	
Feb. 18 Str. E. G. Crosby	Lost her wheel in slush ice; towed to Milwaukee by tug.	
Mar. 1 Str. E. F. Holmes	Ran hard aground; released.	Maumee River, Toledo
Mar. 2 Tug Ohio	Lost her shoe in bucking ice.	Toledo
Mar. .. Tug. W. L. Mercereau	Lost her shoe and rudder.	Ludington, Mich.
Mar. .. Str. Manchester	Damaged by fire.	Milwaukee, Wis.
Apr. 21 Str. R. L. Fryer	Damaged by fire which started in after end; abandoned by owners May 8 as total loss.	Marine City, Mich.
Apr. 22 Str. Western Star	Stranded; released and docked at Lorain May 20; 13 plates damaged and was in dry dock about a week.	Near Bois Blanc Island, Detroit River.
Apr. 22 Str. Sonora	Struck; lightered 500 tons and was released.	Russel Island, St. Clair River.
Apr. 22 Sch. Geo. A. Marsh	Ran ashore during high gale.	Government Pier, Racine, Wis.
Apr. 22 Str. Westmount	Collided with Str. Lake Manitoba; stopped for repairs.	Collingwood, Ont.
Apr. 22 Str. Stormount	Broke her pump after leaving Midland and was towed to Owen Sound for repairs.	Georgian Bay.
Apr. 23 Str. Wilpen	Slightly damaged by fire which started in cargo hold.	Buffalo.
Apr. 24 Str. Huron	Touched bottom; released herself, uninjured.	Channel into Alpena.
Apr. 24 Str. W. A. Rogers	Lost her port anchor.	West Neebish Channel.
Apr. 24 Str. Racine	Damaged by fire.	Milwaukee, Wis.
Apr. .. Str. Yale	Struck while leaving port; docked at Chicago April 27.	Erie, Pa.
Apr. 25 Str. Chas. A. Weston	Ran ashore on rock bottom in heavy fog; released May 2 after lightering part of cargo and was docked at Buffalo May 18; 50 plates damaged; repairs estimated at $50,000.	Point Sanilac, Lake Huron.
Apr. .. Str. Sultana	Ran aground in fog.	Round Island, St. Mary's River.
Apr. .. Str. Sonoma	Ran aground in fog.	Round Island, St. Mary's River.
Apr. .. Str. Lakeport	Ran aground in fog; released by tug, uninjured.	Round Island, St. Mary's River.
Apr. .. Str. Sinaloa	Ran aground; lightered several hundred tons and was released on April 27	Round Island, St. Mary's River.
Apr. 27 Str. Benjamin Noble	Foundered in storm; 20 lives lost; loss about $200,000; insured for $120,000	Lake Superior, near Duluth.
Apr. 28 Str. Buffalo	Ran aground; released and left Soo May 1; docked at Buffalo; repairs completed May 15.	St. Mary's river.
Apr. 28 Str. W. D. Rees	Ran aground; released herself May 2, uninjured.	Seneca Shoal, near Buffalo.
Apr. 28 Str. Champlain	Unloading rig wrecked and thrown across her deck during high wind storm; forecastle deck and sides damaged; went to Ecorse May 13 for repairs.	Duluth, Minn.
Apr. 28 Str. Yosemite	Collided with Str. St. Clair; both boats somewhat damaged.	Duluth, Minn.
Apr. 29 Str. Jesse Spalding	Ran ashore; released May 2; docked at Manitowoc; 57 damaged plates removed and considerable house and deck damage.	Fisherman's Shoal, Green Bay.
Apr. 29 Str. Alpena	Ran aground; released, uninjured.	Alpena, Mich.
Apr. .. Str. R. P. Ranney	Struck; docked at Cleveland May 25; 19 plates damaged; about ten days to make repairs.	Detour, St. Mary's River.
Apr. .. Str. Franz	Damaged while out in storm; temporarily repaired at Soo; pilot house wrecked; upper works torn off and forecastle deck sprung.	
Apr. 29 Sch. Wm. Jamieson	Sank in mid-lake; six lives lost.	Lake Ontario
Apr. .. Sch. Keewatin	Collided, head-on, with Sch. Julia B. Merrill; beached.	Upper Gap, Bay of Quinte.
Apr. .. Sch. Julia B. Merrill	Collided, head-on, with Sch. Keewatin; towed to Kingston, badly damaged	Bay of Quinte.
Apr. .. Tug Umbria	Ran ashore	Carlton Island, Lake Ontario.
Apr. 30 Str. Compton	Carried away three gates in canal; steamer not damaged.	Welland Canal, near St. Catherines.
May 2 Str. F. P. Jones	Struck; docked at Ogdensburg.	Soulanges canal.
May 3 Str. O. M. Poe	Ran ashore in fog; released and docked at Superior; 15 damaged plates; repairs completed May 21.	Bluff Pt., Burlington Bay.
May 3 Str. Myron	Ran on bank while turning.	Near Interstate bridge, Duluth.
May 4 C. F. Pere Marquette 20	Hit bottom while leaving port and twisted rudder stock.	Ludington, Mich.
May 5 Str. America	Ran ashore in fog; released on May 7; docked at Superior; about 9 plates damaged; left dry dock May 21.	Flood Bay Pt., near Two Harbors.
May . Str. George F. Baker	Ran on rocks and was beached to prevent sinking; released May 6 after jettisoning 1,000 tons of ore; temporarily repaired at Portage; docked at Lorain; 62 damaged plates; repairs completed on June 18	Eagle River, Keweenaw Pt., Lake Superior.
May 6 Str. Martian	Ran aground; released, uninjured.	Erie, Pa.
May 7 Str. City of Rome	Burned to water's edge. Total loss.	Off Ripley, N. Y.
May .. Str. Ungava	Ran aground; released on May 7.	Below Cardinal lift lock.
May 8 Str. Canisteo	Became disabled owing to line in her wheel; towed to Sandusky.	Off Point Aux Pins, St. Mary's River.
May 9 Str. Queen City	Struck on west bank; released after lightering 400 tons; docked at Cleveland; repairs completed on May 21.	Livingstone channel.
May 9 Str. George Peavey	Ran aground and blocked channel; released on May 11.	Toledo.
May 10 Str. J. H. Plummer	Ran aground; docked at Montreal.	
May 11 Str. Douglas Houghton	Ran aground at harbor entrance; released, uninjured.	Conneaut, O.
May .. Str. W. J. Averell	Ran ashore; released after lightering 300 tons.	Near Brockville.

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Date.—Name of Vessel.	Nature of Accident.	Place.
May .. Str. Bickerdike	Ran ashore; released after lightering	
May 12 Str. Dundee	Ran on west bank of Cuyahoga river owing to current; not damaged	Lachine canal.
May .. Str. Algonquin	Collided with Str. J. H. Plummer; 13 plates damaged; docked at Collingwood	Cleveland.
May 14 Sch. Bottsford	Struck end of south pier, filled and sank to bottom; towed to dock and repaired	
May 14 Str. S. N. Parent	Collided with Str. City of Ottawa and ran aground; released; port bow damaged; temporarily repaired at Oswego	Sault canal.
May 14 Str. City of Ottawa	Collided with Str. S. N. Parent	Cornwall canal.
May 16 Str. Sonora	Collided with new Pennsylvania draw bridge, damaging it somewhat	Cornwall canal.
May 16 Scow 17	Struck against east pier and sank in harbor	Toledo, O.
May .. Str. E. H. Utley	Hit Bge. Baltic, inflicting some damage	Conneaut, O.
May 19 Str. Amazon	Ran ashore in thick weather; released on May 20 after lightering; docked at Cleveland May 25; four or five days to make repairs	Milwaukee, Wis.
May 20 Str. Arthur Orr	Backed into dock and broke her rudder	Cheboygan Point.
May 21 Scow No. 22	Struck east pier and badly damaged	Chicago, Ill.
May 21 Str. Calgarian	Fire in cargo	Conneaut, O.
May 22 Str. W. H. Gilbert	Struck amidships by Str. Caldera during heavy fog and cut in two; sank in five minutes; crew escaped; valued at $75,000; not insured	
May 22 Str. Caldera	Collided with Str. W. H. Gilbert; almost cut in two; 29 plates damaged; docked at Cleveland	15 miles off Thunder Bay Island, Lake Huron.
May 22 Str. Emperor	Ran ashore; released on May 23, uninjured	15 miles off Thunder Bay.
May 23 Str. Shenandoah	Struck bridge, putting it out of order	Rondeau, Lake Erie.
May 23 Bge. Grampian	In tow of Str. Shenandoah; struck bridge	Bay City, Mich.
May 25 Str. Berthier	Burned to water's edge; probably constructive total loss	Bay City, Mich.
May 25 Str. F. C. Ball	Broke away from moorings in wind storm and drifted ashore at Minnesota Point on sand; released herself June 18, uninjured	Montreal.
May 25 Str. W. A. Rogers	Unloading rig on Northwestern dock No. 1 blew down on steamer demolishing cabin, and damaging smokestack; released on May 27 and went to ship yard	Duluth, Minn.
May .. Bge. Redfern	Took a sheer and collided with a crib; went to bottom on south end of channel	Superior, Wis.
May .. Str. J. J. McWilliams	Hit bridge; docked at Lorain May 28	West Neebish Channel.
May 28 Str. Emma Thompson	Destroyed by fire; crew picked up by Str. Germanic; valued at $6,000	Toledo, O.
May .. Str. W. J. Olcott	Hit pier; about five days to make repairs	Ennis Island, Georgian Bay.
June 3 Str. C. F. Curtis	Ran aground in heavy fog; released, uninjured	Soo.
June 4 Str. Van Hise	Steering apparatus became disabled and quadrant broke; stopped at Sault for repairs	Duluth.
June . Str. Stormount	Struck; docked at Ecorse for repairs; ten plates damaged	Near Encampment, St. Mary's River.
June . Str. Canisteo	Struck bottom; jettisoned her cargo of gravel, was pumped out and floated June 6	Welland canal.
June . Str. Ogdensburg	Struck on way down; stopped at Ogdensburg for repairs	Off Pelee Island, Lake Erie.
June 10 Str. Pueblo	Carried away four gates of lock No. 8, tieing up traffic in canal for a couple of days	Gray's Reef, Straits of Mackinac.
June .. Str. Stadacona	Ran aground; several plates damaged	Welland canal.
June 11 C. F. Ann Arbor No. 5	Ran aground; released, uninjured	Lake Michigan.
June 14 Bge. Geo. E. Hartnell	Ran into a bridge, throwing it into river; port bow plates damaged; repairs completed on June 17	Manitowoc, Wis.
June 19 Str. State of New York	Crashed into Fox's dock and then ran aground in shallow water; released, uninjured; dock and warehouse considerably damaged	Toledo, O.
June 20 Str. Western Star	Ran aground; released	Put-in-Bay, Lake Erie.
June .. Str. Carolina	Collided with Str. Boston; both boats slightly damaged	Toledo, O.
June 4 Str. W. J. Averell	Hit a dock, damaging it; steamer not damaged	Chicago.
June 26 Str. H. C. Frick	While entering Great Northern slip, hit dock, cracking a plate on starboard side	Chicago, Ill.
June 26 Str. Kearsarge	Port quarter damaged when she collided with Str. Sheldon Parks	Superior.
June 27 Bge. Geo. E. Hartnell	Blown ashore in heavy gale; released; docked at Superior on June 30; 5 bilge plates on bottom had to be renewed, 12 plates on bows and several on sides taken off; repairs estimated at $12,000	Milwaukee, Wis.
June 27 Str. Harvey Brown	Collided with Bge. Hartnell in endeavoring to assist her, damaging her bow; several side plates stove in and hole punched in bow; was not docked, but one week needed for repairs, costing about $8,000	Duluth, Minn.
June 27 Str. America	While endeavoring to assist Bge. Hartnell in storm, 2 deck plates near amidship badly cracked; repaired at Superior	Duluth, Minn.
June 27 Str. Mataafa	Thrown against canal pier in storm, knocking out rudder, shoe and wheel; docked on June 29; about 2 weeks for repairs	Duluth, Minn.
June .. Str. W. J. Filbert	Lost bucket off her wheel and put into Marquette for repairs	Superior entry.
June 28 C. F. Milwaukee	Damaged by fire	Lake Superior.
June .. C. F. Pere Marquette No. 5	Broke her high pressure cylinder and was towed to Manistee for repairs	Grand Haven, Mich.
July 1 Str. Robt. C. Wente	Ran aground while entering harbor, owing to low water	Lake Michigan.
July 2 Str. Atikokan	Ran ashore in fog; released on July 5 and docked at Collingwood; 17 plates damaged, ten having to be removed; stern broken in two or three places	Port Clinton, Lake Erie.
July 2 Str. Denmark	Struck a shoal near the ferry dock; released by tugs	Georgian Bay.
July . Str. Majestic	Ran ashore; released; wheel and shoe damaged; went to Collingwood for repairs	Canadian Soo.
July 2 Str. Huron	Struck by Str. Collingwood, her anchor making a hole in the Huron; temporarily repaired at Port Huron	Hope Island, Georgian Bay.
July . Str. J. J. Boland	Arrived at Duluth July 2 with forepeak leaking, having struck; bottom damaged and forefoot torn loose from plating; docked at Ecorse; lower half of stern renewed and several plates taken off	St. Clair Flats Canal.
July . Str. Athabasca	Broke high pressure piston	
July 8 Str. Gogebic	Grounded, coal-laden; lightered	Abreast Detour.
July .. Str. Frontier	Lost her rudder; towed to Ashtabula for repairs	Lake Erie.
July 15 Str. Mary H. Boyce	Ran ashore in fog; released after lightering	
July 16 Str. J. H. Prentice	Ran ashore; released on July 24 and taken to Port Huron; 14-foot hole in bottom forward	Port Hope, Lake Huron.
July .. Str. Port Colborne	Ran ashore; docked at Kingston	Georgian Bay.
July 20 C. F. Ste. Marie 11	Cylinder head of low pressure cylinder blew out; towed to St. Ignace	
July .. Str. Hamiltonian	Ran ashore; 36 plates damaged; to be docked at Buffalo	Pt. Vivian, St. Lawrence River.
July 22 Str. Wm. P. Snyder	Steering gear disabled, carrying her on the bank off Fort Gratiot	
July .. Sch. Wanda	Squeezed by a steamer and beached	Lake Huron.
July 24 Str. W. E. Corey	Lost anchor and 90 fathoms chain in fog	Milwaukee Harbor.
July 24 Str. Huron	Ran ashore; forward compartment full of water and 10 feet of bow stove in; released and docked at Detroit for repairs to her wheel and forefoot; six plates damaged and several plates broken	St. Clair River.
July 25 Dredge C. M. Hall	Struck abutment of lock No. 22; corner demolished below water line; leaked	Georgian Bay near Little Current, Ont.
July .. Str. Saskatoon	Ran ashore; out 2 feet and had to lighter; docked at Montreal	Welland Canal.
July 27 Str. Hoover and Mason	Stuck in W. & L. E. bridge; released by tugs	St. Lawrence River.
July 27 Str. Sarnor	Carried away two head gates of lock No. 8, causing 24 hour delay to traffic	Cleveland.
July 30 Bge. Rob Roy	Tow line parted from Str. Aberdeen after leaving Ashtabula and she ran aground; towed inside by tugs; pretty badly damaged	Welland Canal.
July .. Str. J. H. G. Hagerty	Damaged in launching; docked at Ecorse; frame damage and 23 plates taken off; about 10 days in dry dock	Lake Erie.
		Collingwood, Ont.

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